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BRITISH MEDICAL JOURNAL

LONDON SATURDAY MARCH 27 1943

A STANDARDIZED PLAN OF TREATMENT FOR GASTRO-ENTERITIS IN INFANTS

BY

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Following an outbreak of infantile diarrhoea and vomiting at a base hospital shortly after the onset of war, with the very high mortality rate of 80%, certain strict prophylactic measures were taken and a schedule of treatment formulated; these have resulted in a fall of the death rate to 23% and no recurrence of the disease in epidemic form. We therefore consider it worth while to record our routine procedure as a suitable standard of treatment for use in hospital and to report certain interesting signs of prognostic value and measures taken for prevention of this disease developing in hospital.

Treatment

Chart I shows the schedule of treatment practised in our infantile gastro-enteritis wards.

CHART I.—*Treatment of Gastro-enteritis*

The following is an outline of the treatment to be given in every case of diarrhoea and vomiting Details must be adjusted to suit individual cases.

The Moment to Start.—As soon as there is any suspicion that the disorder is more than a dietetic upset. The following points may help in this distinction:

(*a*) *The Stools.*—Frequent, watery, offensive, or much mucus.
(*b*) *The Vomits.*—Exclude overfeeding, posseting, wind, etc.
(*c*) *A rise of temperature.*
(*d*) *Baby looks ill.*

1. *Give Castor Oil.*—Under 1 year, 1 drachm; over 1 year, 2 drachms.

2. *Stop all Milk*, and give 2- to 3-hourly by mouth half-strength Hartmann's Ringer-lactate solution. Add a little saccharin if necessary.

3. *The Daily Total Fluid Intake* should aim at 2½ oz. per lb. body weight, plus extra for dehydration not exceeding 10 oz. Slight dehydration may be restored by subcutaneous saline given early.

4. *If Dehydration Marked*, put on *Intravenous Drip* of half-strength Hartmann's solution containing 5% glucose for 24 hours, with only sips of water by mouth:

5 lb.	..	15 c.cm. (1/2 oz.) per hour	=	360 c.cm. in 24 hours
7 lb.	..	20 c.cm. (2/3 „) „ „	=	480 c.cm. „ „
10 lb.	..	30 c.cm. (1 „) „ „	=	720 c.cm. „ „
15 lb. or over		45 c.cm. (1½ „) „ „	=	1,080 c.cm. „ „

After 24 hours, feeds should be introduced according to the "pyloric schedule" (Note 6, second method). The drip must be slowed, provided dehydration is corrected, but must deliver enough to make up the day's total to the required amount. As the feeds increase so the drip is reduced. It should be the aim of treatment to make the baby independent of the drip by the end of the third day.

5. *Choice of Milk Feed.*—(1) Breast milk, if obtainable. (2) Half-cream dried milk, with or without lactic acid (e.g., half-cream lacidac, Cow & Gate). (3) Boiled milk with or without lactic acid (babies over 6 months dislike lactic acid milk). (4) Unsweetened condensed milk.

6. *Method of Introducing Milk Feed:*

First Method (when on Hartmann's solution by mouth).—After 24 hours continue the feeds, replacing part of the Hartmann's solution by the milk chosen as follows:

1	part	milk*	to 8	parts	Hartmann's	for	12 hours
2	parts	„	„ 8	„	„	„	„
4	„	„	„ 6	„	„	„	„
5	„	„	„ 5	„	„	„	„

and so on until correct strength for age is reached. Sugar should be gradually introduced when a half-strength milk mixture is reached. (N.B.—Mix the Hartmann's solution and milk immediately before the feed.)

* When dried or condensed milk is used this should be reconstituted to whole milk before adding the requisite "part" to the Hartmann's solution.

Second Method.—A "pyloric" schedule of feeding, to be used when changing from intravenous drip to bottle feeds. Choose one of the milk feeds as in Note 5 and dilute as described in Note 6. Give:

1 drachm	hourly,	3 feeds	12 hours (total 3½ oz.)
2 drachms	„	3 „	
3 „	„	3 „	
4 „	„	3 „	
6 drachms	1½-hourly,	4 „	12 hours (total 6 oz.)
1 oz.	2 „	3 „	
1½ oz.	2-hourly,	6 „	24 hours (total 21 oz.)
2 „	2 „	6 „	
2½ „	3 „	6 „	
3 „	3 „	6 „	

It may be necessary to go more slowly than this and even to alternate milk feeds with Hartmann's solution. With large babies the quantities may be doubled. Babies should have absolute rest, *if possible*, from midnight to 6 a.m.

7. *A Stomach Wash-out* given early in the treatment and occasionally repeated, but not more than once a day, is often effective in checking the vomiting.

A Rectal Wash-out given early in the treatment is effective when stools are particularly offensive with much mucus.

8. *Drugs.*—For collapse: nikethamide (coramine) 0·5 c.cm. intramuscularly every 2 hours up to six injections.

9. *Fresh Air.*—An overheated room lacking ventilation increases a baby's disposition to vomiting and diarrhoea. Warmth by hot-water bottles may be necessary, but open-air ventilation can be used with advantage.

10. *Special Note.*—There is a tendency to overtreat these babies. They collapse very easily. All medical and nursing procedures should be reduced to a minimum.

The Selection of a Suitable Fluid.—Most authors agree to a period of starvation before a milk feed is introduced, but opinions differ as to the most suitable fluid to give during this period by mouth or parenterally. The first function of such a fluid must be to re-establish or improve the excretion of the kidney, as this is the chief mechanism controlling the salt and water metabolism of the infant. Secondly, the substances contained in the fluid should approximate as closely as possible to those of plasma, and be in sufficient quantity to replace that lost by stool and vomit, acting as a good buffer counteracting the tendency to acidosis or alkalosis in these infants. Hartmann (1928) and Hartmann and Elman (1929) composed a fluid with these properties known as Hartmann's Ringer-lactate solution.

Liquor Ringer-Lactatis (Hartmann's Solution)
(Supplement to *B.P.C.* 1934, Part III, Formulary 1941)

	Metric	Imperial
Lactic acid	2·4 ml.	23 m.
Solution of sodium hydroxide	A sufficient quantity to neutralize the lactic acid	
Sodium chloride	6·0 g.	52½ gr.
Potassium chloride	0·4 g.	3½ gr.
Calcium chloride	0·2 g.	1½ gr.
Distilled water to	1,000·0 ml.	20 fl. oz.

At a recent discussion at the Royal Society of Medicine Young (1942) showed that an infant is unable to concentrate solids in the urine to the same extent as an adult. Therefore in dehydration these products accumulate in the body. Although Hartmann's solution is slightly hypotonic, to ensure a good excretory function of the kidney we recommend diluting the fluid by half and adding glucose up to 5% for intravenous or

subcutaneous use, but for oral administration we prefer to omit the glucose in view of the danger of intestinal fermentation accentuating the diarrhoea.

The blood chemistry following the use of various types of fluids has been extensively analysed, and great importance attached to the plasma chloride level, by many workers, with inconclusive results. Hoag and Marples (1931) recommend alternating normal saline and 10% glucose for intravenous use, but Cooper (1937) suggests the addition of calcium gluconate to saline to accelerate the movement of the fluid from circulation to tissue spaces. We, however, consider estimations of plasma chlorides under saline therapy of doubtful therapeutic value, as in several fatal cases the chloride percentage had regained a normal level.

Quantity of Fluid Required.—The total quantity of fluid given daily was kept constant at 2½ oz. per pound of body weight except in cases of dehydration, in which extra fluid up to 10 oz. a day was added according to the degree of dehydration. It is unwise to exceed this quantity owing to the danger of producing oedema.

The choice of milk for the feeds does not seem so important as the method of its introduction, which must be very gradual in all cases, however mild, especially in those with a tendency to vomit. In the latter the introduction may have to be even more gradual than we state in the schedule. Children over 6 months of age with persistent diarrhoea were treated with apple and tea diet (Sheldon and Hall, 1939) with some success, but the danger of this treatment is its tendency to produce vomiting, which in our experience is a more serious symptom.

Chart II is our daily record chart. It facilitates calculations of feeds and shows at a glance the weekly progress of the case. Records for a single day have been filled in.

CHART II.—*Weekly D. and V. Treatment Chart*

Name: J—— D—— *Age* 3 months *Weight:* 10 lb.

Date	29/8/42						
Fluids lost: Stools ..	7						
Vomits ..	2 small						
Urine ..	N.A.D.						
Fluids given: Intravenous ..	15 oz.						
Subcutaneous	—						
By mouth ..	17½ oz.						
Day's total ..	32½ oz.						
Approx. fluid required ..	27½ oz. + 5 oz.						
Estimate of dehydration ..	Moderate						
General condition ..	Poor; restless						
Focal sepsis ..	0						
Operation ..	0						
Type of feed ..	Lactic acid milk + Hartmann's 1 in 4, 2½ oz. 3-hourly—7 feeds						
Drugs	0						
Character of stool	Green, watery						
Other notes ..	Troublesome cough						

Intravenous Therapy.—Intravenous fluid was introduced through a Bateman needle (Allen & Hanburys) after cutting down on a vein. The internal saphenous or veins in the cubital fossa or on the back of the hand were the ones most commonly chosen. If the vacoliter to be used was not calibrated, this was done before starting the operation, by marking in 10-c.cm. units a length of adhesive strapping which if carefully adjusted can be transferred from one bottle to the next when they are changed. The rate of the drip varied according to the size of the dripper and the quantity of fluid required. Approximately 8 to 16 drops a minute will deliver 50 c.cm. in an hour. An accurate hourly record of the quantity of fluid given was kept on a chart (Chart III). It is unnecessary to heat the fluid but important to keep the baby warm with hot-water bottles.

Blood Transfusion (10 to 15 c.cm. per pound of body weight) was useful in cases with severe anaemia or gross sepsis, or in the second or third week when the progress of the child was unsatisfactory. Aldridge (1941) prefers plasma to blood for transfusions owing to the increased viscosity of the blood in these infants, but we consider blood of more therapeutic value provided dehydration is corrected first.

CHART III.—*D. and V. Daily Fluid Chart*

Name: J—— D—— *Weight:* 10 lb. *Date:* 29/8/42

Time	Reading on Scale (c.cm.)	Amount in Hour (c.cm.)	Rate of Drip (Drops/Min.)	Total for To-day (Approx. in Oz.)	Remarks	Fluid by Mouth	Vomits	Stools	Urine
a.m.									
0	120								
1	138	18	7	¾					N.A.D.
2	152	14	5	1½	Restless			1 green, watery	
3	172	20	8	1¾					
4	189	17	7	2½					
5	205	16	6	3					N.A.D.
6	223	18	7	3½	Lactic acid milk + Hartmann's sol. 1 in 4 →	2½ oz.	1 small	1 loose, yellow	
p.m.									
12	540	18	7	15	Lactic acid milk + Hartmann's sol. 2 in 3 →	2½ oz.		1 loose, yellow	N.A.D.
	Totals	..	..	15		17½ oz.	2	7	

Total fluid for the day, 32 oz.

Relapses were of two types. (1) The infant who responded at first to treatment and then started to vomit again and had an increased number of watery stools. In the first relapse of this kind the full schedule of treatment was started again, omitting the castor oil, but in subsequent relapses the milk mixture was persisted with as far as possible by mouth and the remainder of the fluid requirement was given parenterally. (2) The second type occurred in infants who reached the convalescent stage with normal stools and then relapsed. This was fairly common, but the child appeared to gain a certain immunity to the disease, as there were no fatalities in second or third attacks. The full schedule of treatment was given for each relapse of this nature, usually starting with castor oil.

Drugs.—Several varieties of the sulphonamide group of drugs were given by mouth or intravenously for parenteral infections with unsatisfactory results. The importance of a good fluid excretion by the kidney during the administration of these drugs is well recognized, but in infantile gastro-enteritis, in spite of an adequate intake, this excretion is reduced to subnormal by excess elimination from the bowels, less often by vomiting and from insensible perspiration of the lungs in a febrile child. Fifty-two babies were given a course of eucortone and six infants were tried on nicotinic acid, but no significant change was noted, so these drugs were discontinued.

Results

From Nov., 1940, to April, 1942, 100 infants under 2 years of age were treated for gastro-enteritis at the Hospital for Sick Children, Great Ormond Street, and its base hospital at Hemel Hempstead. Twenty-three of these died—a mortality of 23%. Realizing that the mortality depends to a large extent on the type and severity of the disease, we attempted to assess these by instituting a system of "marks" for certain symptoms and signs—the higher the number of marks scored the greater the severity of the disease and the more serious the prognosis. Chart IV shows our marking system.

It was soon found that this system had too many fallacies to be of statistical value. For example, personal variations cannot be excluded, and therefore certain estimates are only approximate; also, some features of the illness, such as diarrhoea and vomiting, may never fully develop. This particularly applies to the worst type of infantile gastro-enteritis showing practically no dehydration, vomiting, or diarrhoea, but merely

the toxic facies—a type in which the child may be dead in 24 hours. However, certain interesting facts of prognostic value evolved from our system; these seem worth recording.

CHART IV.—*An Index of Severity*

Features of the Illness	Scoring 2 Marks	Scoring 1 Mark	Scoring 0	Marks Scored
1. Weight of infant before onset of D. and V.	—	14% or more underweight	Less than 14% underweight or overweight	
2. Age	Under 6 months	6 months to 1 year	Over 1 year	
3. Where disease developed	—	In hospital	At home	
4. Duration of symptoms before treatment started	—	Over 3 days	0 to 2 days	
5. Appearance of infant (collapsed, toxic, shocked, ashen)	Severe	Moderate	Mild	
6. Dehydration ..	"	"	"	
7. Parenteral infection	Present at onset of disease	Arising after onset	None	
8. Maximum number of stools in 7 consecutive days	More than 40	30 to 40	Less than 30	
9. Maximum number of vomits in 7 consecutive days. (More than 14 scores 4 marks.)	8 to 14	—	0 to 7	
10. Altered blood in vomit ("coffee-grounds")	Present	—	Absent	
			Total ..	

Weight.—Cooper (1937) recognized the importance of the weight of the infant at the onset of the disease. In his series of 300 cases the mortality rose from 36.5% to 65.0% in those 30% or more underweight. Maitland-Jones (1933), however, considers the figure of 14% or more underweight for age as representing an atrophic infant, and this figure we chose as our criterion. Thirty children fell into this category and 12 died—a mortality of 40%.

Age.—In agreement with other authors we found the disease most lethal in the first six months of life.

Age of Child	No. of Cases	No. of Deaths	% Mortality
Birth to 6 months	65	17	26·2
6 months to 2 years ..	35	6	17·1

Where Disease Developed.—Of great significance was the high death rate in infants developing the disease in hospital as compared with those contracting it at home.

Disease Developed	No. of Cases	No. of Deaths	% Mortality
In hospital	46	15	32·6
At home	54	8	14·8

Length of Illness before Treatment Started.—The importance of starting treatment early has already been stressed. Our figures show that if treatment was begun within two days of onset of symptoms the mortality fell from 25.9% to 20%.

Treatment Started	No. of Cases	No. of Deaths	% Mortality
0–2 days	40	8	20
3–5 "	30 } 54	8 } 14	26·7 } 25·9
Over 5 days	24 }	6 }	25·0 }

Dehydration.—In agreement with Campbell and Cunningham (1941) we found that the mortality was closely associated with the degree of dehydration, rising as the latter increased in severity.

Degree of Dehydration	No. of Cases	No. of Deaths	% Mortality
None	22	0	0
Slight	27	1	3·7
Moderate	17	3	17·6
Severe	34	19	55·9

Parenteral Infection, if present at the onset of the gastro-enteritis, carried with it a higher mortality, whereas infection developing after the onset was not of such serious prognostic significance.

Infection at Onset	No. of Cases	No. of Deaths	% Mortality
None detected	61	12	19·7
Present	38	11	28·9

Vomiting was an important symptom. More than 14 vomits in one week carried with it a high rate of mortality. "Coffee-ground" vomit containing altered blood was seen in 12 cases, only 2 of which recovered.

Maximum No. of Vomits in 7 Consecutive Days	No. of Cases	No. of Deaths	% Mortality
0 to 7	59	4	6·8
7 to 14	16	4	25·0
Over 14	24	15	62·5

Diarrhoea.—We took a less pessimistic view of the frequent watery stool, finding it easy to control provided there was no vomiting. However, our figures suggest that if frequent stools persist longer than a week the prognosis is not so good.

Maximum No. of Stools in 7 Consecutive Days	No. of Cases	No. of Deaths	% Mortality
0 to 30	37	6	19·4
30 to 40	37	9	32·1
Over 40	21	8	61·5

Discussion

The treatment of infantile diarrhoea and vomiting is too often unsatisfactory and haphazard. The mortality from this disease varies from 14 to 88%—seeming to depend to a large extent on the severity of the disease, which, as already shown, is difficult to assess scientifically. The toxicity rises in epidemics, when the mortality may reach 100%. Rice and his co-workers (1937) report 16 outbreaks in 11 lying-in institutions in America from 1934 to 1936: 505 cases were affected, with a fatality of 46%. The accompanying table shows results from the literature.

Table showing Cases and Mortality Rates in the Literature

Author	Institution	No. of Cases	% Mortality
Campbell and Cunningham (1941)	Park Hospital	574	27·7
Cooper (1937)	Royal Hospital for Sick Children, Glasgow	300	47·2
Recorded by Cohen *et al.* (1933) ..	Brooklyn, New York	175	35·0
Rice *et al.* (1937) ..	Eleven lying-in institutions in America	505	46·0
Smellie (1939)	Birmingham	500	48·0

The treatment varied so considerably from author to author that no correlation could be detected between any special method and the recovery rate. In view of this and the unsatisfactory mortality rate, particularly in those developing the disease in hospital, it is our opinion that prevention calls for far greater study, especially in hospitals and nurseries for infants.

Prevention

As a result of our first epidemic at the base hospital in 1940, when 12 out of 15 infants died, the following preventive measures were taken:

1. Better spacing of beds, interspersing baby-cots with those of older children. The number of children in a ward was reduced to half the number of adults the ward was designated to hold.

2. Masks and gowns were worn by all attending any baby under 2 years old.

3. An isolation ward for babies developing gastro-enteritis was obtained, and medical officers were encouraged to send the infants there on the slightest suspicion of the disease.

4. Ventilation was improved in order to keep a cool moving air in the wards, and nurses were encouraged to keep the infants warm with hot-water bottles rather than raise the temperature of the ward.

These measures were effective in reducing the incidence rate and preventing another epidemic; but they are far from ideal, and further recommendations are suggested.

5. Whenever possible, treat an infant in its own home unless the condition it suffers from demands admission to hospital. In hospitals the risk of infection is enormous unless the cubicle system, and nurses trained in prevention of infection, are available.

6. When admission is essential, babies under 2 years of age should be nursed in cubicles.

7. If a baby contracts gastro-enteritis it should be kept in its cubicle, and on discharge the latter should receive proper cleansing and preferably remain empty for a day or two.

8. After the war, nurseries for infants under 2 years of age should be discouraged. This would particularly apply to nurseries in maternity homes. To overcome this problem the ideal maternity home could be divided up into separate cubicles for mother and child. This seems a justifiable step to take when such figures as those quoted by Rice and his co-workers (1937) are considered.

9. If an outbreak develops in an institution, further admission for infants under 2 years old should temporarily cease, as many infants as possible be sent home, and the remainder be widely separated among older children or adults. Where one room alone has been used for the children this should be closed, thoroughly cleaned, and aired.

Summary

A plan of treatment for infantile diarrhoea and vomiting which has worked with encouraging results is put forward as a basis for use by those in charge of sick infants. One hundred infants were treated by this method, with a mortality of 23%. Certain interesting figures of prognostic value are recorded, including the high death rate of 32.6% in infants developing the disease in hospital compared with those developing it at home. In view of this and the recorded high mortality in institutional epidemics, measures for the prevention of the disease in hospital and nurseries are given.

Adequate treatment demands team-work and probably presents as highly skilled a form of nursing as any in diseases of children.

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MILITARY MEDICINE IN THE MIDDLE EAST

AN EXPERIENCE OF 13,542 CASES

BY

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This paper is based on the work of the medical division of a large hospital situated in a base area in the Egyptian desert, and covers a period of eighteen months (March, 1941, to Sept., 1942); the cases were unselected admissions from local camps and from convoys from the forward areas. It seemed to me that a brief survey of the medical problems out here might be of interest in England. This climate, while on the whole healthy, is unsuitable for those prone to certain diseases, which should be better known to those selecting troops for service here. We work with limited clerical and much-depleted medical staffs. The turnover of patients is very large, and elaborate statistical analyses are impracticable. From official and private records a good idea of the larger disease groups can be got, but the rare diseases have had to take their proper place against the utilitarian background of war and will only be touched upon here.

The relation between medical and surgical admissions has ebbed and flowed with the tide of battle, but there have been roughly three medical to two surgical admissions. The types of case dealt with will be considered in large groups, and conclusions will be given rather than the arguments supporting them. Some of the conclusions will be at variance with accepted tropical teaching, but the controversial opinions expressed upon dysentery will be discussed in a fuller paper when time permits.

The approximate incidence of the cases, expressed in percentages, is given in Table I.

TABLE I.—*Percentage Distribution of Disease; 13,542 Cases*

Tropical diseases	45%
Acute and chronic respiratory diseases	17%
Skin diseases (including scabies)	15%
Functional and organic nervous diseases	7%
Infectious diseases	5%
Chronic digestive disorders	4%
Chronic rheumatism—articular and non-articular	3%
Diseases of kidneys and bladder	1%
Circulatory diseases	0.7%

Tropical Diseases

The figures relating to the various tropical diseases are given in Table II.

TABLE II.—*6,144 Cases of Tropical Disease*

Dysentery group	4,178 (2 deaths)
Short-term fevers	1,153
Malaria	735 (1 death)
Avitaminoses	34
Relapsing fever	19
Bilharziasis	18
Kala-azar	5
Leprosy	1
Effects of heat	1 (1 death)

The Dysentery Group

Diarrhoea is the most important disease of the Middle East, and nearly one-third of medical admissions were due to it. Although it is probable that, apart from a few cases of food poisoning, the cause is the dysentery bacillus, cases are divided into two groups according to whether blood and mucus are visible in the stools or not. If they are, the condition is called "dysentery"; if absent, "acute catarrhal enteritis" or "Gippy tummy." The distinction is useful, as it makes a rapid assessment of severity easy, and is to be objected to only when different causes are postulated. The duration of stay in hospital of 600 cases of dysentery was 19.5 days, and of 600 cases of acute enteritis 11.5 days.

Laboratories are overburdened by the routine attempt to isolate the dysentery bacillus; success varies, and depends upon collaboration between the laboratory and the ward, which is seldom perfect. A strong plea could be made for limiting laboratory examinations to a search for *Entamoeba histolytica*; dysentery can be adequately managed with minimal laboratory help, as severe cases must be treated on clinical indications just as urgently as must diphtheria.

TABLE III.—*Dysentery Group; 4,178 Cases*

Amoebic dysentery, including hepatic amoebiasis	36, or 1%
Acute catarrhal enteritis	2,313, or 55%
Bacillary dysentery	1,829, or 44% (2 deaths)
(Of positive isolations, Flexner 70%, Shiga 19%, Sonne 6%, Schmitz 5%)	

Treatment.—The contribution which this war will make to dysentery will be an appraisal of the value of specific chemotherapy and probably the abandonment of the use of castor oil and salts. On my responsibility—it was then almost a crime—saline treatment was stopped in this hospital in the summer of 1941; I do not think the treatment is of value, and on theoretical grounds it has much to condemn and little to commend it. Our usual treatment is rest in bed, ample fluids, a bland diet, and morphine to relieve colic in a few cases; dysentery has not, on the whole, been severe, so that in only about 10% of cases is any further treatment necessary. In patients whose diarrhoea persists more than seven days and who show active inflammation on sigmoidoscopy, and in all severe cases, one of the sulphonamide group has been given. Sulphaguanidine has been available since April, 1941, and both sulphanilamide and sulphapyridine have been used more recently. The conclusions we have reached are that sulphanilamide in tablets is of limited value; sulphapyridine and sulphaguanidine seem to be of equal value, and as specific in dysentery as the former is in pneumonia. As sulphaguanidine does not upset the patient it is the drug of choice in both acute and chronic dysentery; in the few cases of non-specific ulcerative colitis treated there has been no improvement. While the use of Shiga serum in very severe cases is compulsory, I have treated a few with double doses of sulphaguanidine, and recovery has taken place in attacks which were likely to have proved fatal.

Results.—There have been two deaths—one from exhaustion when adequate supplies of sulphaguanidine were not available, and the other that of a patient who already had a pericolic abscess when he reached us from the Western Desert. One patient was invalided home after a very severe dysentery, as he developed ulcerative colitis; a second patient was invalided home to South Africa owing to impairment in his health—he had been a prisoner of war; three patients were temporarily re-graded for base duties for three months. The remaining patients made a complete recovery. I regard this as a creditable record in such a disease, and I think it must be attributed to the use of sulphaguanidine in all the severe and prolonged cases: chronicity with permanent ulceration was not allowed

to occur. Every case with diarrhoea lasting for more than 10 days was sigmoidoscoped.

Short-term Fevers

Approximately 2,000 patients (15% of the series) were admitted with "P.U.O."—pyrexia often heralded by a rigor, headache, and perhaps vomiting, but without signs or symptoms pointing to inflammation of throat, lungs, bowels, or other organs. Naturally a routine procedure has been adopted for these cases: repeated physical examination, especially for splenic enlargement; twice-daily blood films for three days; an accurate temperature record. With such numbers blood counts are impossible except where there are special indications. From this group of 2,000 cases either the progress or the laboratory findings excluded malaria, meningitis, the enteric group, relapsing fever, and a certain number of cases of dysentery with a febrile onset without diarrhoea at first. An alarmingly large residue of 1,153 cases is left. Of these, 805 have been called "sandfly fever," a diagnosis which in most of them is probably correct, but as we have not had an epidemic it is not easy to be certain of sporadic cases. I feel that textbooks have claimed too much for the clinical picture of sandfly fever, for I have seen typical cases prove to be malaria, relapsing fever, and once poliomyelitis; in the absence of an epidemic it is wise to make the diagnosis with reservations. The other 348 cases of short-term fever remain an unexplained problem and offer a fruitful field for research; they have not borne any resemblance to true influenza.

The short-term fevers are the cause of much morbidity but no mortality, and require the services of a good laboratory; they must not be treated as malaria, as to do so trebles their stay in hospital and would be a serious waste of man-power. They are sources of anxiety only when they last more than four or five days, as more serious diseases have then to be considered.

Malaria

TABLE IV.—*Malaria; 735 Cases*

Benign tertian	597, or 81%
Malignant tertian	44, or 6%
Quartan	9, or 1%
Ovale	1
Clinical	84, or 11% (1 death)

Malaria has been mild, and very few cases of the pernicious type have been seen. It has not been a difficult disease once it was realized that almost any febrile condition could be malarial, and its response to treatment has been so dramatic that in a few days no further anxiety was felt. I am aware that in other theatres of war the problem is different. The treatment has been to give quinine in solution in doses of 10 gr. thrice daily until the patient is afebrile, then mepacrine hydrochloride (atebrin) 0.1 g. thrice daily for five days, and after two days' rest a sterilizing and anti-relapse course of pamaquin (plasmoquine), 0.01 g. thrice daily for three days. With a constantly changing population it is not possible to give rates of relapse after this standard course, but they would seem to be low. I was impressed with the number of relapses occurring among those who had not received the pamaquin course.

There has been one death; it resulted from acute haemolytic anaemia with haemoglobinuria during the pamaquin course—haemolysis was checked, but the patient died from pneumonia. Too much stress need not be laid on this case of blackwater fever, as we had a similar case during the treatment of pneumonia with sulphapyridine, and a second case without a discoverable cause: both recovered.

The guiding principle in malaria has been to withhold quinine until the diagnosis has been established by the laboratory, unless (1) the patient is very ill and delay may prove fatal, or (2) the clinical picture together with an enlarged spleen makes malaria probable although repeated blood films have been negative. Eleven per cent. of the cases fell into this group of "clinical" malaria.

Avitaminoses

It is a tribute to the supply services that so few cases of deficiency disease have occurred: of the 34 cases admitted 31 were due to severe pellagra in non-British troops—there were no deaths. Nicotinic acid was given to the worst ones, and prompt modification of the diets in their camp put a stop to the outbreak.

Three cases of beriberi were admitted from the Western Desert; one was of the fulminating type with oedema and peripheral neuritis: this man died before we could treat him. The other two cases were mixed beriberi—one severe with great cardiac enlargement on *x*-ray examination, and the other mild; one of these patients had been for many months on desert patrols, and the other had been in the besieged Tobruk garrison. Response to injections of B_1 was rapid.

Relapsing Fever

It was not until we had been out here for some months that it became recognized that a tick-borne type of relapsing fever occurred in the Western Desert and was transmitted to troops living in caves and in holes in the ground. The disease is presumably similar to that found in Palestine and Iraq, but differs from louse-borne and African tick-borne relapsing fever. We have diagnosed 19 cases, but undoubtedly some were missed. The spirochaetes are very scanty in the blood, and large numbers of films, in several bouts, may have to be examined before they are found. The paroxysms of fever are brief, seldom lasting more than 24 hours, and resemble those of malaria; one patient at different times had both diseases, and was unable to distinguish between them. The resemblance to sandfly fever is close, as headache is severe in both diseases: many mistakes have probably been made, as patients with sandfly fever are usually discharged before the twelfth day, the usual date of the next paroxysm of relapsing fever.

This type of relapsing fever is characterized by brief bouts of fever with severe headache, giddiness, and usually splenic enlargement; the interval between attacks is 10 to 14 days. In a fair proportion of cases after a few paroxysms there are signs of involvement of the nervous system—lymphocytic meningitis or cranial nerve palsies, or a combination of both. The course of the disease seems to be unaffected by intravenous arsenical preparations, and there is a proved case in which 17 relapses occurred in spite of treatment. Stovarsol by mouth is at present being tried, and appears to be efficacious. The practical points about this type of fever are its frequent confusion with malaria and with sandfly fever and the difficulties of laboratory diagnosis in the absence of a supply of experimental animals; if prolonged observation is practicable the syndrome is characteristic enough to warrant a clinical diagnosis, especially if the nervous system becomes involved.

Bilharziasis

Although 18 cases of bilharziasis have been admitted, the only British soldier infected had caught it in South Africa: troops are aware of the dangers of fresh water in Egypt. The remaining 17 patients were Mauritians who had been infected in their own country. All the cases were due to *S. haematobium*. The only symptom was haematuria, and treatment with injections of tartar emetic was effective.

Kala-azar

In certain areas of Africa there is endemic kala-azar which is resistant to antimony and which gives rise to a curious clinical picture; one such area in the Sudan provided many cases, and five were admitted to us. The first case was quite baffling: the patient had a continued fever, splenomegaly, and leucopenia, and was regarded as a case of enteric-group fever until the persistence of the temperature began to raise very grave doubts—all laboratory tests had been negative. Brigadier Sidney Smith, the Consultant in Tropical Medicine, saw the patient and recognized his case as similar to the ones he had seen from the Sudan. Three other cases were later admitted from the same district, all presenting the same picture; it is unlikely that there will be more, as the area is no longer of military importance. In addition to the above-mentioned features the daily temperature charts showed a double rise in 24 hours, which is typical of kala-azar. The leucopenia and neutropenia were noted in all cases; but, apart from a positive formol-gel test in two cases, laboratory investigations were negative. We were unable to find Leishman-Donovan bodies in the spleen, marrow, or lymph glands, nor could we culture them from the blood. A fifth case similar to the other four occurred in a negro from the Cameroons, another recognized endemic focus.

We did not have an opportunity of treating our cases, as they were all transferred to one hospital in Cairo, where they were treated with neostibene, a new synthetic drug; the results were, I understand, excellent.

Effects of Heat

In this inland desert district the summer temperature is very high, usually over 105° and occasionally rising to almost 120° in the shade, but the humidity is low. No case of heat stroke (hyperpyrexia) has been admitted, nor has the condition developed in any patient under medical treatment in the wards. On the surgical side there have been a few cases of post-operative hyperpyrexia, probably due to heat stroke. Numerous cases have been sent into hospital as heat stroke, but every one proved to be an infection—malaria, sandfly fever, or septicaemia. I have constantly urged that, while the usual measures for reducing temperature should be at once adopted, a search for the infection must be made, and an intravenous injection of quinine be given if there is even the flimsiest suggestion of malaria. In other districts in the Middle East heat stroke has, I understand, occurred.

One case of heat exhaustion has been admitted to hospital. This occurred in a man who had had heat exhaustion in the Red Sea, from which he had only partially recovered on disembarkation; his arrival in this area unhappily corresponded with the record heat wave in May, 1941, when the shade temperature was just under 120°. His symptoms were marked weakness and complete anorexia; he was wasted and dehydrated, the systolic blood pressure was 62 mm. Hg, the temperature was subnormal, and the blood showed marked haemoconcentration. He was vigorously treated with saline solutions by all routes, adrenaline, and cortin; but he failed to respond, and died of suppression of urine on the fifth day of his stay. The necropsy showed no macroscopic changes in any organ, and the pituitary and suprarenal glands were normal.

Respiratory Diseases

TABLE V.—*2,402 Cases of Respiratory Disease*

Acute:		
Tonsillitis and pharyngitis	1,171	
Laryngitis, tracheitis, bronchitis	620	
Primary pneumonia	169	(4 deaths)
Coryza	65	
Chronic:		
Bronchitis, asthma, emphysema, bronchiectasis	337	
Pulmonary tuberculosis	40	(2 deaths)

Respiratory diseases were responsible for 17% of the medical admissions. There is nothing remarkable about the acute group except the high incidence of tonsillitis. Every case of pneumonia was treated with sulphapyridine, and the mortality was very low. While there were many atypical cases, I did not think the disease was different from what it is in England. The number of chronic chest cases was not very high, but the group is most important, as 126 had to be either invalided to the United Kingdom or re-graded for limited service in the Middle East. Too much stress cannot be laid on the fact that chronic chest conditions are greatly aggravated by the climate in Egypt and Libya, and men prone to such troubles should not be sent out here.

Skin Diseases

Of the 2,142 cases admitted to the skin wards 639 had scabies, which seems to be less common than in England; the routine treatment was with Marcussen's ointment. Most of the skin diseases were the common ones seen in England; prickly heat has been uncommon.

Desert sores have been a big problem in the Middle East, and many cases have been admitted to the skin wards. While I am not competent to disentangle this dermatological puzzle, the clinical aspects are simple: the sores are indolent ones, usually multiple, on exposed parts, chiefly forearms and legs, and often due to infected abrasions or insect-bites. The factor common to all types is their slowness to heal outside of hospital, their rapid healing in hospital, and their satisfactory response to a variety of remedies *in hospital*. Any sore or wound may be infected with the diphtheria bacillus by droplet infection, and, rarely, this happens in desert sores. The single very indolent sore has been suspect, so we swab them as a routine measure. We have had at least two cases of extensive peripheral neuritis and one case of fatal heart failure in these diphtheritic desert sores.

Infectious Diseases

TABLE VI.—*703 Cases of Infectious Diseases*

Acute infective hepatitis	341	(1 death)
Diphtheria (faucial)	130	(4 deaths)
Mumps	118	
Acute rheumatism	30	
Enteric group	24	(6 deaths)
Measles (all forms)	17	
Meningitis, benign lymphocytic	16	
Poliomyelitis and encephalitis	8	(1 death)
Erysipelas	8	
Meningitis, cerebrospinal	6	
Scarlet fever	4	
Meningitis, streptococcal	1	(1 death)

This table needs little explanation; the high incidence of acute infective hepatitis (epidemic jaundice), the very few cases of enteric fever, and the negligible occurrence of cerebrospinal fever and scarlet fever are obvious. It is probable that some of the patients with benign lymphocytic meningitis were unrecognized cases of relapsing fever. Mumps was almost limited to Seychellois and East African troops.

Acute Infective Hepatitis.—Although this has been the commonest infectious disease its aetiology is obscure and will remain so until a susceptible experimental animal is found. The disease is similar to the English variety, and no new treatment has been found; few cases are admitted in the pre-icteric febrile phase, when it is impossible to distinguish it from a short-term fever. The fatal case was admitted after a few days of jaundice; the patient did not seem particularly ill; but suddenly he became cholaemic and died within the first 24 hours.

Diphtheria.—Among so many cases of diphtheria in adults it is not surprising that the throat signs have often been atypical and resembled acute coccal infections or even quinzy—suspicious throats are oftener swabbed than at home. It is not possible to give figures showing the incidence of paralyses, but they have been of a severity that was quite outside my previous experience: recovery has been slow, but in all cases it was complete, and even two cases of diaphragmatic paralysis recovered. The mortality of 3% from diphtheria is not high.

Enteric Group.—The 24 cases include typhoid, paratyphoid, and clinical typhoid fever, without laboratory confirmation. The low incidence is the result of the satisfactory state of the troops with respect to inoculation, but I have been impressed with the severity of the cases due to *B. typhosus*: inoculation did not seem to have modified the course of the disease once it was contracted. The mortality rate of 25% would be much higher if only cases of typhoid fever were considered. The disease remains uninfluenced by any treatment but good nursing, and the sulphonamide group is ineffectual.

Other Causes of Illness

There is a small unanalysed group of cases—surgical conditions overflowing to the medical division, miscellaneous diseases, and rarities—which will not be dealt with. Table VII contains an analysis of conditions which would bulk large in an English hospital but which accounted for only 16% of the admissions here; the figures are available for only the last 7,190 admissions, but there has been no significant change in their admission rate over the whole period.

TABLE VII.—*Other Causes of Illness among 7,190 Admissions*

Nervous diseases		487
Organic	16	
Psychosis	15	
Psychoneurosis	456	
Chronic digestive diseases		291
Peptic ulcer	56	
X-ray-negative dyspepsia	213	
Other diseases	22	
Circulatory diseases		54
Effort syndrome	30	
V.D.H. and other diseases	24	
Chronic articular and non-articular rheumatism		240
Urinary diseases		73
Acute nephritis	13	
Renal colic, oxaluria, etc.	60	

Causes of Death

Thirty-two deaths have occurred, but seven were in untreatable diseases: cerebral tumour (2), cancer of stomach (1), cancer of hepatic ducts (1), acute monocytic leukaemia (1),

acute myeloid leukaemia (1), tuberculous meningitis (1). Table VIII shows the causes of death in the other cases, and, where applicable, the percentage mortality of the disease.

TABLE VIII.—*Causes of 25 Deaths*

Diphtheria (faucial)	4 (3%)
Diphtheria (cutaneous)	1
Acute primary pneumonia	4 (2.4%)
Malaria—blackwater fever	1 (0.13%)
Pulmonary tuberculosis	2
Bacillary dysentery	2 (0.10%)
Enteric group	6 (25%)
Acute infective hepatitis	1 (0.3%)
Streptococcal meningitis	1
Heat exhaustion	1
Encephalitis	1
Staphylococcal septicaemia	1

Conclusion

I have tried to condense eighteen months' work into a few thousand words, and have had, perforce, to appeal to figures and tables—always dull things; it is hoped that the main problems of Middle East medicine have been made clear.

We have not been working under conditions to which we were accustomed in peacetime. This hospital is built on desert which was uninhabitable three years ago; every possible amenity has been provided and we have ample safe water, a good hot-water system to the wards, electric lighting from a mains supply, and every reasonable drug and instrument. Three-quarters of the patients have been treated in tents and only the minority in the few hutted wards, conditions which would be impossible in England but are by no means ill adapted to this climate. I feel that the results of treatment could hardly have been bettered under our peacetime civilian conditions.

To practise in a country where tropical disease is rife is to get a glimpse into the future which is opening out before the advances of chemotherapy. While much of tropical specific therapy is old, much is new, and it has been a unique experience to treat bacillary dysentery with the newer sulphonamides. If from the cases treated here the ones amenable to specific chemotherapy are excluded—malaria, amoebiasis, bilharziasis, kala-azar, the avitaminoses, pneumonia, cerebrospinal meningitis, tonsillitis, and bacillary dysentery—there are only small groups of cases still remaining refractory. There is no specific treatment for enteric fever, or such virus diseases as acute infective hepatitis, coryza, and encephalitis or poliomyelitis. Sandfly fever is not important from the point of view of treatment, as it is so brief. Finally, I would again draw attention to the adverse effect of this climate on chronic chest diseases.

SPECIFIC IDENTIFICATION OF THE CHIEF PATHOGENIC CLOSTRIDIA OF GAS GANGRENE

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The isolation in a pure state and the identification of the chief anaerobes of gas gangrene—namely, *Cl. welchii*, *Cl. septicum*, and *Cl. oedematiens*—are everywhere recognized as being beset with peculiar difficulties, owing partly to the need of these bacteria for oxygen-free conditions of cultivation, and partly to their tendency to grow in cryptic association with other anaerobes in spite of prolonged efforts to obtain pure cultures. The method described below is likely to aid in their identification, since it depends upon the highly specific, lethal, and antigenic toxin which is characteristic of each of them. This method consists in growing the bacterial inoculum on the surface of agar to which an appropriate amount of one of the specific antitoxins has been added. During the growth of the colony toxin is produced, diffuses outwards from the colony, and interacts with the homologous antitoxin to form a delicate but unmistakable precipitate resembling a halo round the colony.*

The method is identical with that which was found by one of us (Petrie, 1932) to serve as a differential test for rough and smooth strains of meningococcus, pneumococcus, and *B. dysenteriae* (Shiga) and to establish a clear distinction between group 1 strains (type 1 and type 3) and group 2 strains of meningococcus (cf. Branham, 1940). When, for example, a smooth strain of group 1 meningococcus is grown on an agar plate containing 5% of the homologous immune serum a precipitate is formed round the colonies which is composed of the polysaccharide complex (the somatic antigen) in union with the protein of the specific antibody, whereas in the anaerobic group under discussion the precipitate consists, in the final analysis, of a purely protein aggregate—namely, the toxin molecule in combination with a variable number of the specific molecules of the homologous antitoxin. Molecular aggregates of each kind, irrespective of the chemical nature of the reacting substances, become linked together to appear as a macroscopic precipitate in agar, as described below; in a fluid medium the product of the reaction takes the form of floccules. Soon after the publication of the earlier paper the author made a limited number of observations on the effect of seeding the Park-Williams No. 8 strain of *C. diphtheriae* on agar plates containing diphtheria antitoxin, when ring-like precipitates were noted round the colonies.

Technical Details of the Method

The method is essentially a simple one, and any difficulties that may be encountered are likely to be due to the strict necessity for providing a high degree of anaerobiosis in order to obtain adequate surface growths on agar plates; this proviso applies particularly to *Cl. oedematiens*.

The medium used is 2.5% agar containing the ingredients that are added for the routine production in this Institute of high-grade toxins of the three anaerobes. The basal medium is a horse-meat infusion broth (1 lb. to 1 litre of tap-water heated to 95° C. with 0.5% acetic acid, neutralized and filtered) together with 3.5% Evans peptone and 0.5% sodium chloride; *p*H adjusted to 7.8, 2.5% agar added, and the medium tubed in 17-c.cm. amounts and steamed or autoclaved. Before pouring the melted agar the following ingredients are added to it in sterile solution when the temperature has fallen to about 45° C.

For *Cl. welchii*: 2 c.cm. of a mixture containing 5 g. glucose in 100 c.cm. of a sulphated horse-muscle extract (Macfarlane and Knight, 1941), bringing the final concentration of the extract in the medium to 10% and of the glucose to 0.5%. For *Cl. oedematiens*: 2 c.cm. of the sulphated horse-muscle extract, but *without glucose*.† For *Cl. septicum*: 2 c.cm. of a mixture containing 5 g. glucose in 100 c.cm. heated normal horse serum (56° C. one hour) so that the final concentration of serum in the medium is 10% and of the glucose 0.5%.

Lastly, there is added at the same time 1 c.cm. of a dilution in broth of the appropriate antitoxin, which, when added to 17 c.cm. of agar and 2 c.cm. of extract or serum mixture, represents approximately 8 I.U. per c.cm. of the final medium. The special ingredients can be mixed to provide a sterile solution, and it is doubtless an advantage to add to each mixture an amount of *l*-ascorbic acid, which favours anaerobic growth by virtue of its being a reducing substance, to give a concentration of 0.025% in the final medium.‡

After the plates are poured they should be dried in an incubator at 37° C. for at least 5 hours in order to prevent motile organisms from filming over the surface. The plates may be spread in the usual way, or a heavy inoculation with a platinum loopful of a pure or reasonably pure culture may be implanted on the agar at any chosen site. The plates are examined after 24 or 48 hours' incubation at 37° C. anaerobically. If the resulting colonies are well grown but show no precipitate the plates should be placed at room tem-

* The Nagler reaction resulting from the diffusion of toxin from colonies of *Cl. welchii* on human serum agar plates is used to identify this bacterium (Hayward, 1941).

† There is reason to believe that for both *Cl. welchii* and *Cl. oedematiens* equally good results can be obtained by omitting the sulphated horse-muscle extract from the medium; the agar to be tubed should then be increased from 17 c.cm. to 19 c.cm.

‡ The special ingredients and antitoxin solutions should be kept preferably in a refrigerator, or otherwise in the coolest place available, and great care should be taken to preserve their sterility. Assistance will gladly be given in the technical application of the method if inquiries are addressed to the Lister Institute, Elstree, Herts.

perature aerobically and observed daily, because the haloes, especially those of *Cl. oedematiens*, may be slow in appearing.

Characteristic Features of the Precipitates

There is usually no difficulty in recognizing the halo against a black background with ordinary good daylight, but a simple magnifying-glass or even a binocular dissecting microscope of low magnification is helpful on occasion. At an early stage, when the zone of precipitate is narrow and of slight density, or when it is desired to light up the structural details of the halo to the best advantage, a simple improvised illuminator can be used. This consists of a black plyboard, 1 × 1½ ft., with a back-rest and a central opening about one inch in diameter, which may be fitted with an iris diaphragm; an electric light provided with a white reflecting shade is placed behind the opening in a position which allows only the reflected light to illuminate the desired portion of the plate. The best view is obtained by ensuring that the external surface of the agar plate is clean and by removing the cover.

When the precipitate has been laid down as an apparently uniform deposit and is left aerobically at room temperature, concentric (Liesegang) rings often appear. These are so characteristic that the specific nature of the precipitate is established beyond doubt (Figs. 1, 2, and 3). They form much more

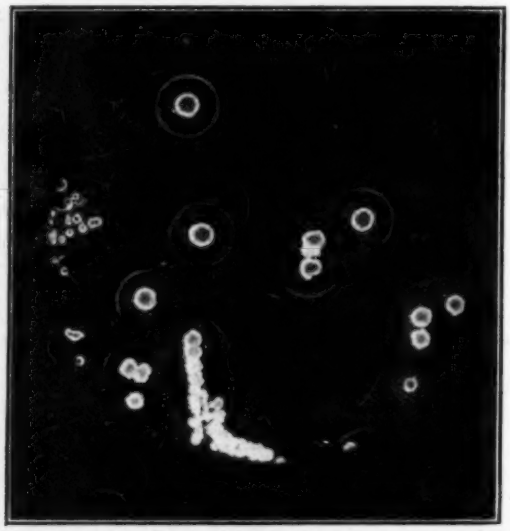

FIG. 1.—Shows rings of specific precipitate round the colonies of *Cl. welchii* on an agar plate containing *Cl. welchii* antitoxin.

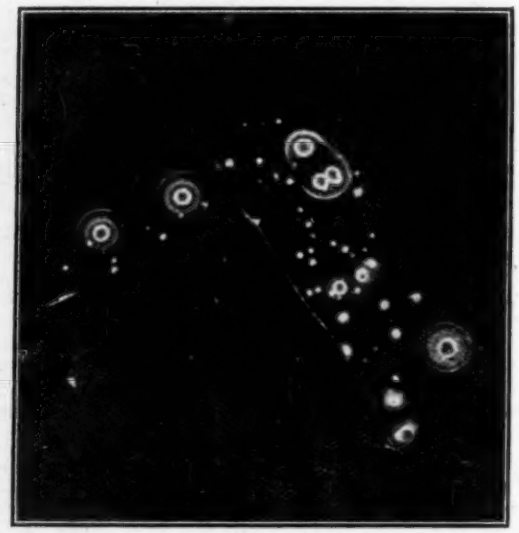

FIG. 2.—Shows rings of specific precipitate round the colonies of *Cl. septicum* on an agar plate containing *Cl. septicum* antitoxin.

quickly and more readily than the similar rings already described and illustrated in the haloes that are formed when an antibacterial serum against smooth strains of pneumococcus or group 1 meningococcus is incorporated in the agar (Petrie, 1932). A striking feature of the rings in the anaerobic haloes is the fact that, though the margin of the colony may be

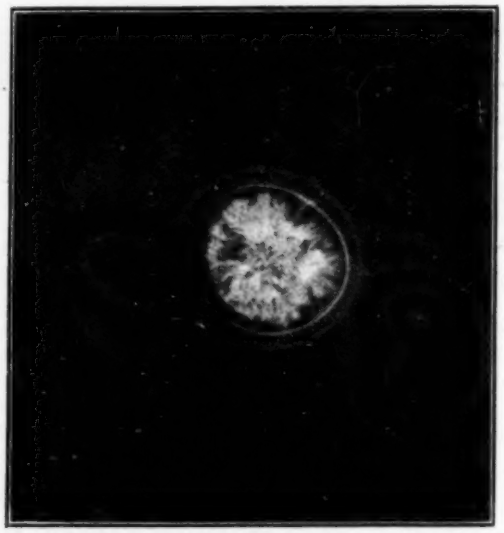

FIG. 3.—Shows rings of specific precipitate round a colony of *Cl. oedematiens* implanted on an agar plate containing *Cl. oedematiens* antitoxin.

wavy or irregular, the circular zones give the impression of having been drawn with compasses. Two or three colonies on a spread plate may be seen to be enclosed within a double ring, or a bar of growth may show a double contour in the precipitate extending from its margin.

The breadth and also the density of the rings in a particular halo often vary. Thus one of the best specimens so far obtained was observed after three weeks at room temperature round a colony (8 × 8 mm.) of *Cl. oedematiens* on agar which contained 75 I.U. of *Cl. oedematiens* antitoxin per c.cm. of the medium. Here there were four rings of precipitate separated by four clear zones. The innermost zone of precipitate was close to the colony but separated from it by a narrow clear space: this zone was narrow (0.5 mm. across) and of such a density as to appear white; then followed a clear zone of 0.5 mm.; then a zone of precipitate of 1 mm., showing a central groove as if about to split and of moderate density; then a clear zone of 1 mm.; next, a zone of precipitate of 1 mm. and of slight density; next, a clear zone of 2 mm.; and, lastly, a zone of precipitate of 1.5 mm. and with the least density of all. The measurements are approximate. A similar picture was given by a colony of *Cl. tetani* (type 1) when grown on a medium containing tetanus antitoxin.

The concentration of the antitoxin, expressed as I.U. per c.cm. of the medium, influences the extent and the density of the precipitate at an early stage of its development. Thus both an excess and also a suboptimal concentration of antitoxin may inhibit the reaction, in accordance with the fact that an excess of either of the reacting substances in the ordinary flocculation test brings about solution of the floccules. This no doubt explains why a narrow clear zone immediately adjoining the colony margin invariably intervenes between the colony and the precipitate, since the concentration of the toxin per unit-volume of medium is presumably highest in this region.

The most likely explanation, in our view, for the appearance of concentric zones is that the forces which combine to build up the framework of molecular aggregates as a uniform deposit to the naked eye are not in equilibrium, and that at a later stage stresses or strains in the structure result in condensation of the precipitate in the form of annular zones separated by clear zones. The remarkable symmetry of the concentric zones is evidence that the molecular aggregates which constitute the toxin-antitoxin precipitate within the semi-rigid matrix of the agar gel are disposed in an ordered arrangement and that the forces controlling them are in equilibrium. When the precipitate shows little tendency, even after a prolonged interval, to form multiple annular zones—as, for example, the diphtheria toxin-antitoxin halo—the density seems to increase from the

margin of the colony to the outer margin of the halo, which appears as a dense ring and which may be surrounded by an extremely tenuous precipitate of considerable breadth, detectable when photographed but not apparent to the naked eye. This variety in its final form also gives the impression of representing a stage of stable equilibrium. The technique may prove to be useful for the study of periodic structures in general and of the physico-chemical basis of the toxin-antitoxin reaction.

Optimal Conditions for Production of Specific Haloes

The need for using a medium which is favourable for toxin production has been indicated by finding that ordinary agar and peptic digest agar are less suitable than the media recommended here. A natural (unconcentrated) antitoxic serum appears to give better results than a salt-concentrated antitoxin or a purified antitoxin as obtained by the pepsin process. The concentration of the antitoxin in the medium, as already stated, is an important factor. In our experience an amount equivalent to 4 to 8 I.U. per c.cm. of the medium gives good results for each of the three strains of anaerobe tested by us, but a smaller amount may prove to be better adapted to less toxigenic strains met with in field work.

When the plates are removed from the anaerobic jar after 24 or 48 hours they may show no sign of a precipitate, but if kept at room temperature aerobically a halo will appear and Liesegang rings may develop. This observation merely proves that toxin had diffused from the colony before its interaction with antitoxin had become manifest as a precipitate. The presence of formalin vapour does not inhibit the development of the reaction.

General Observations on the Method

The ease with which the reaction is obtained is fortunately in the order of the relative frequency and importance, as causal agents of gas gangrene, of the three anaerobes—namely, *Cl. welchii*, *Cl. septicum*, and *Cl. oedematiens*—and may depend upon the rate and vigour of the surface growth of each species on agar plates. The precipitate formed by *Cl. welchii* can be seen after 24 hours' anaerobic incubation. Until experience of the method has been gained it is advisable to keep the plates, after adequate growth has been obtained anaerobically, for a week or 10 days at room temperature aerobically in order to trace the sequence of changes in the haloes.

The method has probably a considerable advantage over those used hitherto, since the association of other bacteria in the colony will not exert a deleterious influence upon the formation of the specific precipitate so long as the toxin of the clostridium remains unaffected by metabolites liberated by the contaminants. As is well known, much of the confusion in defining and specifying the characters of the pathogenic anaerobes by determining their biochemical activities was caused in the past by the presence of unsuspected bacterial symbionts in cultures that were apparently pure. Obviously the method will fail when non-toxigenic colonies or strains appear on the plates, but from a practical point of view in relation to gas gangrene this result is not of serious moment, and is indeed an advantage.

Alternative Applications of the Method

The reaction has also been obtained in a column of agar in a test-tube inoculated on the surface with a culture of *Cl. welchii*; the homologous antitoxin had been added to the agar. The precipitate showed three zones, one above the other, to a depth of 4 mm. below the surface. There can be no doubt that a Seitz filtrate of a broth toxin prepared from the anaerobes in question will give a specific precipitate when superposed on a column of agar containing the corresponding antitoxin. When the toxin molecules have diffused into the agar, precipitation will take place either uniformly or in zones (Brown, 1940).

When the requisite apparatus for obtaining surface growths on agar plates in strictly anaerobic conditions is not available, a modified technique of this kind is worth a trial for detecting toxins in mixed cultures, and we suggest the following procedure.

Employ suitable selective methods to encourage the growth of each of the anaerobes sought for in the primary material, such as wound exudate. Subculture into a separate meat-broth tube or small flask of the Robertson type, but modified, as explained above, to favour toxin production of the corresponding anaerobe. Grow for 48 hours, filter through a Seitz disk, pipette the filtrate of each culture in a suitable amount on the top of a column of 2.5% saline agar containing 8 I.U. of the corresponding antitoxin per c.cm. of the medium, keep the preparation for one day or more at room temperature, and note whether a precipitate appears in due course. The addition of ascorbic acid to the fluid media during the enrichment process will favour both growth and toxin production.

This simplified procedure may not, however, always succeed, owing to destruction of the specific toxin by proteolysis, or from other adverse conditions induced by the accompanying contaminants. There has, as yet, been no opportunity of testing whether the method is a practicable one for determining the presence of one or more of the pathogenic anaerobes in the exudates of gas gangrene.

When the usual methods of obtaining effective anaerobiosis cannot be applied, the device recommended by Cruickshank and Macdonald (1942) may be adapted to our method and given a trial. These authors grow the inoculum on the surface of an ascorbic-acid–agar medium, superpose a sterile cellophane disk, and pour a layer of the same agar over the cellophane. The original account should be consulted for further details.

Specificity of the Reaction

There can be little doubt that the reaction is a highly specific one. Controls with normal horse serum and with the heterologous antitoxins have been negative. With our present knowledge of these toxins it can be asserted with confidence that when the test is positive the identification of the bacterium needs no support from any other differential character, such as its proteolytic or saccharolytic activities or its pathogenic action in susceptible experimental animals.

The Method as Applied to Investigation of Anaerobic Flora of Wounds and to Diagnosis of Gas Gangrene

The observations recorded here are based on one toxigenic strain of each of the three clostridia—namely, those which are used in this Institute for the routine production of the toxins intended for the immunization of horses. A limited number of comparative observations on halo production by the highly toxigenic Park-Williams No. 8 strain of *C. diphtheriae* and by weakly toxigenic strains—one gravis and two mitis cultures—when implanted on the same plate containing diphtheria antitoxin, showed that the gravis and mitis colonies produced haloes, although the precipitate took longer to form than that which was seen round the No. 8 colony; this result may be significant in the present connexion as indicating that the reaction has a fairly elastic range, provided that time is given for it to mature. Moreover, in a series of agar plates containing varying amounts of *oedematiens* antitoxin good haloes appeared within a range of which the extremes represented 7 and 70 I.U. per c.cm. of the medium, although in some of the plates the reaction was considerably delayed. If 8 I.U. of the antitoxin per c.cm. of the medium should prove to be an excessive amount, 4 units, 2 units, or 1 unit or less per c.cm. may readily be substituted by preparing successive dilutions of a portion of the antitoxin solution with an equal volume of sterile broth and adding 1 c.cm. of the dilution so prepared to the melted agar.

We hope that workers in Army and civilian laboratories who have opportunities of examining severe wounds will give the method a trial and thus help in defining its sphere of usefulness.

Summary

A method of identifying the three chief pathogenic clostridia met with in gas gangrene, by means of specific precipitation resulting from a toxin-antitoxin reaction round the colonies on agar plates, has been described. The appearances presented, and particularly the formation of Liesegang rings, are so characteristic as to leave no doubt of the identity of the associated bacterial species.

Our best thanks are due to Mr. J. Smiles of the National Institute for Medical Research for photographing agar plates illustrating the features of the specific precipitates.

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TRICHLORETHYLENE ANAESTHESIA IN PLASTIC SURGERY

BY

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Striker *et al.* in 1935, and more recently Hewer (1942), have reported very favourably on the use of trichlorethylene as an agent for general anaesthesia. From these reports it appeared that this drug would have definite advantages when employed for anaesthesia in plastic surgery. These advantages were: (1) adequate analgesia in light planes of anaesthesia; (2) no increase in bleeding due to the anaesthetic agent; (3) minimal irritation of the respiratory tract; (4) freedom from post-anaesthetic vomiting; and (5) freedom from explosion hazard. We decided to test the drug on a series of 200 cases. Our experience led us to abandon its use after 100 cases.

Age and Type of Patients

The average age of the patients in this series was 29 years. The youngest was 10 years old, the oldest 65; 50 were between 19 and 40; 4 were under 19, and 46 were over 40. With 13 exceptions these patients were Class A anaesthetic risks. These 13 were considered fair risks, and the majority of them were not regarded as Class A risks only because of the presence of blood in the airway due to recent facial injuries.

Premedication.—Each patient received omnopon gr. 1/3 and scopolamine gr. 1/150 before operation. This premedication was ordered for three-quarters of an hour or one hour before the time scheduled for operation. In 9 cases it was actually given at periods up to two hours before induction, owing to alterations or delays in the operation schedule.

Induction

All patients but one were induced by the intravenous administration of sodium pentothal in 5% solution (Table I).

TABLE I.—*Induction and Maintenance*

Agents Used	No. of Cases
Pentothal, N_2O, and trilene	33
Pentothal, cyclopropane, and trilene	1
Pentothal, trilene, and O_2	65
Trilene and oxygen	1

The average dose given was slightly under 0.5 g. Thirty-three patients had nitrous oxide and oxygen, with trichlorethylene added. One had cyclopropane added during the induction. One patient was induced and maintained throughout with trichlorethylene and oxygen alone. The remainder had trichlorethylene and oxygen only, after the pentothal induction. The average amount of trichlorethylene used was 5.5 c.cm. per hour of anaesthesia and 7.4 c.cm. per patient. The preparation employed was that marketed under the name "trilene" and packed in glass-stoppered amber bottles for use in anaesthesia.

With two exceptions the nitrous oxide–trichlorethylene inductions were smooth, but somewhat more prolonged than we usually expect with ether, using a similar technique. Owing to the effect of the drug on respiration we found it difficult to evaluate the level of anaesthesia. Induction with trichlorethylene and oxygen alone, following pentothal, is prolonged, and often the robust patient recovered from his dose of pentothal rapidly enough to provide some excitement in the second stage. The one patient induced with trichlorethylene and oxygen without previous pentothal had profuse salivation and a very violent second stage.

In all instances we used closed-system anaesthesia of the circle type, with carbon dioxide absorption. In 97 cases the trichlorethylene was administered from a vaporizing bottle containing a wick and placed in the rebreathing circuit. In three a drip vaporizer outside the circuit was used. This last method proved unsatisfactory because of the low volatility of the agent. In 76 cases the anaesthetic was administered through a Magill endotracheal tube.

Effects on Respiration

The respiratory rate was increased in all but 16 patients (Table II). With the increase in rate there was in all cases

TABLE II.—*Respiratory Rate*

Rate per Minute	No. of Patients
18 to 25	16
26 to 46	78
60 to 80	5
Respiratory arrest	1

a decrease in respiratory excursion. Five patients achieved respiratory rates of over 60 a minute at a stage of anaesthesia corresponding to the second plane of the third stage (Guedel). One of these patients had a respiratory rate of 80 a minute at this plane, and one robust subject had respiratory arrest. In the remainder the respiratory rate varied between 26 and 46 a minute. Except in the cases with extreme increase of respiratory rate no cyanosis was seen.

Cardiovascular Effects

The most constant effect on the cardiovascular system was the development of bradycardia (Table III). Forty-four patients

TABLE III.—*Pulse Rate*

Peripheral Pulse	No. of Patients
Normal rate and rhythm	36
Irregularities	19
Bradycardia	44
Irregular during recovery	1

had pulse rates under 60 a minute, 10 of these rates being between 40 and 50. Twenty-five had rates of between 60 and 70. The pulse rate in most cases varied inversely with the depth of anaesthesia, decreasing as the plane of anaesthesia was deepened. This decrease in pulse rate was associated with increase in respiratory rate. In several cases the respiratory rate equalled or exceeded the pulse rate.

Nineteen patients had irregularities of the peripheral pulse during anaesthesia. With two exceptions these irregularities occurred with normal or accelerated pulse rates, and disappeared with the onset of bradycardia. In these two cases the peripheral pulse rate was irregular at slow rates, and a count of the rate at the cardiac apex showed a pulse deficit of about 30 beats, the apex beat also being irregular. These irregularities appear to be due to the occurrence of extrasystoles. One patient had an irregular pulse rate for 30 minutes during the post-anaesthetic recovery period.

One patient apparently had 3:1 heart-block shortly after induction, the pulse rate increasing suddenly from 40 to 120 a minute. Cyclopropane had been used during the induction of anaesthesia in this case.

During one operation the surgeon applied to a raw area a large pack soaked in 1:1,000 adrenaline solution. The pulse rate rapidly increased from 60 to 120, and became weak and "thready" in quality. It was at this point that inquiry by the anaesthetist revealed the presence of adrenaline in the pack. The pulse improved rapidly after its removal.

Blood pressure usually remained within normal limits. There was a general tendency for some increase in the systolic and pulse pressures in patients with bradycardia or normal pulse rates. In those with tachycardia or irregularities the blood pressure was very labile, and in one case it varied from 104/70 to 150/70 to 120/76 in a period of ten minutes. One young patient, aged 29, whose blood pressure before operation was 124/80, had a range from 160/100 to 240/160 during an anaesthesia lasting 65 minutes; throughout this time his pulse rate remained regular at 56 a minute.

Recovery

All patients recovered consciousness within a reasonable time after cessation of the anaesthetic, the average for the group being 35 minutes, and the longest two hours. Recovery time was roughly proportional to the duration of anaesthesia. With one exception there was no post-anaesthetic depression: this case was the one in which anaesthesia was induced and maintained by trichlorethylene–oxygen alone. The patient recovered consciousness in 90 minutes, but remained drowsy for 24 hours. Peripheral pulse, blood pressure, and respiration, however, were normal.

Complications

Vomiting.—Sixteen patients in this series vomited post-operatively. Of these, 10 vomited a small amount once only during the recovery period; 3 vomited once shortly after recovery; 1 vomited several times during the first 12 hours, and another during the first 36 hours; and the remaining patient vomited once 10 hours after the operation. There were no cases of persistent vomiting. Only one patient had recently taken food, and in this case there was no vomiting. Patients who did not vomit made no complaint of nausea after the anaesthetic.

Respiratory.—Seven patients had a history of recent respiratory infection. One of these had a post-anaesthetic pulmonary atelectasis, and another, with a history of chronic bronchitis, suffered an exacerbation of his complaint. These were the only subjects who showed any respiratory complication.

Discussion

We feel that, on the whole, the advantages of trichlorethylene as an anaesthetic agent for plastic surgery are far outweighed by its disadvantages. The only advantages of the use of the drug as an agent for surgical anaesthesia would seem to be freedom from explosion hazard, minimal irritation of the respiratory tract, and small cost. The disadvantages lie chiefly in its action on the cardiovascular and respiratory mechanisms, and its low volatility.

Although no facilities existed for electrocardiographic examination of this series of patients, it would appear from clinical observation that the drug has a definite action on the conducting mechanism of the heart, as well as a direct irritant or sensitizing effect on the myocardium. The relation of the bradycardia to the increase in respiratory rate and decrease in respiratory excursion suggests to us that part, at least, of the effect on the cardiovascular mechanism may have origin in the central nervous system. We consider that these cardio-respiratory effects require further elucidation before trichlorethylene is accepted as an anaesthetic agent for general use.

Summary

A series of 100 administrations of trichlorethylene for general anaesthesia in plastic surgery is reported.

The respiratory rate is greatly increased by the drug, and the respiratory excursion decreased. This result is associated with slowing of the cardiac rate as deeper planes of anaesthesia are attained. There is some instability of the systemic blood pressure. One case of heart-block occurred—after cyclopropane induction. Extrasystoles are frequent.

Post-anaesthetic recovery was good, and the only respiratory complications occurred in two patients who had a history of recent respiratory infection. Sixteen patients vomited after operation.

It is felt that the cardio-respiratory effects of trichlorethylene require further elucidation before this drug is accepted as an agent for general anaesthesia.

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Speaking at a conference on venereal disease called by the Scottish Committee of the British Social Hygiene Council and held at Edinburgh on March 5, Mr. Thomas Johnston, Secretary of State, said that in Scotland last year there were nearly 5,000 recorded cases of fresh infection, apart from cases among Service personnel. In one Scottish town known infections had risen from 36 to 419. Existing treatment facilities were adequate for the increased number of cases, but it was most desirable that persons infected should come forward promptly and, what was no less important, should continue treatment until they were told by their doctors that it was safe to stop. About 40% of the patients who left centres did so before they were pronounced cured, and over 20% left before even completing a course of treatment. The Scottish Medical Advisory Committee had considered the increase in venereal disease at its first meeting and had advocated better sex education of young people, in which parents, school staffs, and family doctors could help. These diseases were more than a medical matter, and were, in fact, closely bound up with behaviour and with the ethical standards from which behaviour springs.

A NOTE ON TRICHLORETHYLENE ANAESTHESIA

BY

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Since Hewer's (1941) suggestion that trichlorethylene might be a useful general anaesthetic a number of communications have appeared dealing with individual cases and difficulties, but we have seen only one report of a general investigation—that of Elam (1942). We venture, therefore, to offer the following observations. We have used the drug in the form of trilene in 306 cases, and have investigated such various points as could conveniently be done in ordinary hospital practice.

Technique of Administration

We have used the open mask and the machines of Shipway, Marrett, and the standard Boyle–Magill. We ultimately adopted the Boyle–Magill, and found that anaesthesia was well maintained with a flow of 3 to 4 litres of nitrous oxide and 1½ to 2 litres of oxygen per minute, the surface of the trilene in the chloroform bottle being faintly ruffled. There was partial rebreathing but no tension on the spring of the outlet valve. Using this method, surgical anaesthesia was induced in 7 to 11 minutes and maintained on a consumption of 1 drachm of trilene in 5 minutes during short anaesthesias or 1 oz. an hour for prolonged administrations.

Type of Anaesthesia

Induction.—In 22 of 143 cases (15%) there was a little struggling during the second stage. The patients who struggled were nervous women rather than plethoric men.

Relaxation.—This was much less than with chloroform, ether, or gas–ether anaesthesia. In 15 of 53 abdominal cases (28%) anaesthesia could not be pushed beyond plane 1 of stage 3, and resort was had to ether. This figure does not include a number of cases in which our colleagues bore with less relaxation than is generally considered desirable, and we take this opportunity of gratefully acknowledging their forbearance.

Cumulative Effect.—This is reflected in the relatively smaller quantity required in long administrations, already referred to.

Mode of Action

The drug appears to act by virtue of its solution in the blood and action on the central nervous system. We noticed that physical measures designed to increase the amount taken up by the body, over and above that obtained by the technique already described, had no influence whatever on the rate of induction or on the depth of anaesthesia obtained. These measures included heating the trilene with the water-bath designed for ether, bubbling the oxygen through the fluid instead of blowing across the surface, and increasing the tension on the outlet valve. The sole results were that anoxaemia was produced and that trilene was wasted.

We conclude, therefore, that overdosage from presenting too high a concentration of vapour is not the danger it is with chloroform, and that an ordinary skilled anaesthetist will produce the deepest anaesthesia possible in about 10 minutes, after which further efforts at securing relaxation are useless.

Effects of Trilene Administration

Respiratory System.—No salivation or irritation was noticed. Tachypnoea was troublesome in many cases. In 79 of 104 cases the respiration rate was over 40 after the patient had settled down. Rates of 60 a minute and over were often recorded.

Circulatory System.—Blood-pressure observations showed practically no change in the first half-hour and a slight fall thereafter. In a few of the longer administrations (one hour or more) the systolic pressure became irregular, varying up to 10 mm. Hg between beats.

Primary Syncope.—We had one fatal case of this in a girl aged 3 with some history of bronchitis; she was being anaesthetized for a hernia operation. The case resembled in every way the well-known primary syncope of chloroform anaesthesia, and we attribute this to the same mechanism of vagal inhibition.

Sugar Metabolism.—We were able to have blood-sugar estimations in only 3 cases. In each there was a rise after 30 to 45 minutes, but much less than that recorded for chloroform or ether by Hewer (1939). Acetone was found in the urine on the morning following operation in 23 of 68 cases, in none of which had ether been used. This is in striking contrast to Hewer's report that he did not find acetonuria in any case at all.

Post-operative Vomiting.—This was absent in 52 out of 80 cases, and slight in the remaining 28.

Use in Midwifery.—We have administered trilene on an open mask in two normal cases. The cumulative effect was especially noticeable, so that after about 15 minutes analgesia was produced with only the occasional addition of a few drops to the mask.

Conclusions

1. The action of trilene resembles that of chloroform.

2. The limited solubility of the drug in the body fluids renders overdosage very unlikely, and also satisfactory anaesthesia difficult in many cases.

3. Primary syncope is a danger, as with chloroform.

4. Trilene is indicated: (*a*) when it is necessary to administer a non-inflammable anaesthetic by means of a machine—e.g., in diathermy operations on the throat or upper air passages; (*b*) when an adjuvant to gas-oxygen anaesthesia is required and ether is contraindicated.

5. Its use as an analgesic in midwifery deserves consideration.

N.B.—Since the above was written, Mr. Stowell (*British Medical Journal*, 1943, **1**, 302) has pointed out that trilene is not suitable for operations with diathermy, since at 125° C. it decomposes, forming phosgene and hydrochloric acid.

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Medical Memoranda

Fatal Poisoning by Methyl Salicylate Liniment

The following case is recorded because of the rarity of published cases of poisoning by lin. meth. sal., because the dangerous potentialities of this liniment as a poison are not fully appreciated, and because of the disastrous result of failing to carry out stomach lavage.

CASE HISTORY

The victim was a Sudanese servant aged 33, of medium height and weight and enjoying normal health. He drank lin. meth. sal. at about 2.30 p.m. on May 19, 1941, in the belief that it was alcohol. The amount of liniment drunk was not more than 4 oz., but it was taken at one gulp in an attempt to impress his friends who had previously sipped it and decided that it was unpalatable. The man rapidly became extremely ill, vomiting copiously and passing into a state of collapse, but, owing to the circumstances of the drinking and the belief of his friends that he was merely extremely drunk, no medical aid was summoned until 5 p.m., when the illness seemed more severe than it should have been. When seen at that time he was restless, fully conscious, able to talk freely and rationally, and did not appear to be in any pain (indeed he admitted that he had no pain), but he was much distressed. He had vomited frequently, and vomit seen later was a clear yellow fluid with a little mucus, smelling strongly of wintergreen. The tongue was moist; there was no evidence of corrosion on the lips, tongue, throat, or buccal mucous membranes. The breath smelt strongly of lin. meth. sal., but breathing was normal. The skin was extremely cold to the touch and a few beads of perspiration stood on his forehead. His pulse was regular, of good volume, and rate 100. Pupils were equal. The abdomen was soft and there was no evidence of pain or tenderness.

The stomach was not washed out, but copious fluids were ordered with sodium bicarbonate by the mouth and, later, a mixture of milk and water. This he took well, but he vomited two or three times during the following few hours, though his general condition was improving when he was seen at 6 p.m. and again at 7 p.m. Later he complained of noises in the ears, but at 9 p.m. he was feeling very much better, his pulse rate was 80, vomiting had ceased, and he was sitting up in bed smoking a cigarette. During the night he passed water twice. However, the following morning when seen at 7.45 a.m. his condition had greatly deteriorated. His pulse was 90, regular, and of fair volume, the skin was again cold and clammy, and the tongue moist but slightly furred. His breathing, however, was noisy, laboured, and increased in rate, and he was taking very little interest in his surroundings. Two hours later his condition was still worse: respirations 32, temperature 97° F., pulse thready and accelerated to a rate of 112. Fine crepitations were now audible at both lung bases. A white blood count showed a polymorphonuclear leucocytosis with a total count of only 2,400. At 11 a.m. the pulse was 122 and very feeble, respirations 32, skin still cold, and he appeared very gravely ill. The lung signs had proceeded apace, and in addition to the crepitations at the right base there was impairment of the percussion note at the left base with bronchial type of breath sounds. In short, the signs of lobar consolidation were now evident. Sulphapyridine 5 g. was given (10 tablets) and nikethamide (coramine) and strychnine injected; the sulphapyridine was to be continued 1 g. four-hourly. By 1 p.m. the patient was delirious and so restless that morphine 1/6 gr. was required to quiet him. This subdued his restlessness but his condition did not improve, and at 2.45 p.m. on May 20 he died, almost exactly twenty-four hours after drinking the liniment.

COMMENT

It seems likely that the fatal issue was not directly due to the toxic effect of lin. meth. sal. *per se*, since there was an initial period of acute illness due to traumatic gastritis, followed by a well-marked period of recovery in spite of evidence of absorption of the poison, indicated by the noises in the ears. It almost seemed as if the danger was past, but the recovery was succeeded by the rapid development within a few hours of signs of lung consolidation. This lung involvement was particularly impressive and definite. It is possible that in the course of vomiting in a somewhat collapsed condition, some of the regurgitated liniment may have been inspired and passed to the lungs, acting as an irritant, and thus facilitating, if not actually causing, the onset of basal consolidation, much in the same way as the irritant poison gases such as phosgene and chlorine act. I feel strongly that gastric lavage would have prevented this complication. The chief reason it was not adopted was that we were misled as to the facts at the time; the real facts only came out at the subsequent inquiry. Finally, one clinical observation was quite striking—the extreme coldness of the skin at the time of the first examination.

I am indebted to Lieut.-Col. T. Scott Law, R.A.M.C., for permission to publish these notes, and to Major J. Mackay Dick, R.A.M.C., for his help in connexion with the case.

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Captain, R.A.M.C.

Tetanus in the Puerperium

Dr. A. T. Duncan's case recorded in the *Journal* of Oct. 10, 1942 (p. 426), recalls to my mind a case of tetanus in the puerperium which occurred in my practice 28 years ago and proved fatal. The chief interest of that case lay in its unexpected origin.

The patient, a 2-para, was a rather fragile and delicate young lady of about 25. Six days before labour occurred she complained of pain and slight swelling over the left upper jaw, obviously due to carious teeth, which had completely cleared up by the time of her confinement. Labour was somewhat protracted and difficult owing to occipito-posterior presentation; forceps were used, and there was a little difficulty in expressing the placenta owing apparently to some adhesion of the membranes. After the confinement the patient ran a temperature (under 100°) for ten days; it then dropped to and remained at normal.

On the 12th day she complained of right-sided trismus with slight pain over the right jaw. There was no swelling, but slight tenderness was felt on pressure over the upper and lower right molars. On the following day right-sided trismus persisted and, in addition, there was slight retraction of the neck. Next morning the temperature was still normal, but there was decided swelling over the right lower jaw, and difficulty in swallowing had developed. Later in the day the temperature rose to 100°. Under chloroform forcible opening of the jaw revealed an abscess of the lower right wisdom tooth with a few drops of pus escaping from the surrounding gum. The tooth was extracted. The temperature dropped to normal and absence of trismus was noted for the next two hours, when it reappeared and remained.

On the 15th day an attempt to swallow medicine produced a very severe tetanic spasm of the throat and neck muscles, in which the patient became black in the face and ceased to breathe, while the arms were stiff and facial contraction occurred. A succession of these severe attacks continued at fairly frequent intervals during that day and the following night, and proved fatal next morning. Dr. Mervyn Gordon, bacteriologist to St. Bartholomew's Hospital, happened to be staying in the town and kindly saw the patient with me. At his suggestion the offending wisdom tooth was sent up to St. Bart's laboratory, and in the abscess at the root of the tooth the tetanus bacillus was definitely found.

Consideration as to how the bacillus had reached the tooth led to further inquiry, when it was elicited that the patient was fond of apples and bananas, and had recently been seen to break into the peel with her teeth instead of using a knife or other means.

Penzance. E. C. EDWARDS, M.D.

Reviews

RHINO-LARYNGOLOGY

Surgery of the Nose and Throat. Edited by John Devereux Kernan, M.D. (Pp. 701; illustrated. $15.00 or £3 10s.) New York and Edinburgh: Thomas Nelson and Sons. 1942.

Surgery of the Nose and Throat, edited by Dr. John Devereux Kernan, is another of the Nelson Loose-leaf Series, and is the work of nine contributors, including the editor. The surgery of the nose and its accessory sinuses is described by Harry Neivert in a complete and satisfying fashion. The physiology of the nose and the work of Proetz receive attention, and the need for a conservative outlook is recognized. A much shorter article on the reconstructive surgery of the nose, by James Barrett Brown, follows. This is excellent and well illustrated, though there is a little overlapping with the previous chapter. The surgery of the oropharynx and nasopharynx, by George Renfrew Brighton, is concerned almost exclusively with the tonsils and the local complications which arise from tonsillitis. Adenoids are included, and with this limitation a good description with an anatomical basis is given. The surgery of non-malignant conditions of the larynx is described by John Devereux Kernan and Arthur J. Cracovaner. This portion is comparatively short, occupying 137 pages, including many illustrations; but it is well designed, and ends with a description of laryngofissure. It is full of information on every relevant matter except cancer, to which a separate chapter by Hayes Martin is devoted. This chapter includes the pathology, surgery, and radiological treatment of cancer of the larynx. It is the least satisfactory part of the book, and the attempt by one writer to describe all three aspects of the subject has not produced a convincing description of any of them. The author takes it as an axiom that all extrinsic cancer is inoperable, a proposition which is refuted in the following chapter on malignant tumours of the pharynx, by Henry B. Orton. Chevalier L. Jackson contributes a short chapter on bronchoscopy—an excellent account which does not attempt to delve deeply into the technical details of the manipulative and instrumental manœuvres for removing foreign bodies, but is a useful general survey. The masterpiece is reserved for the end. This is Chapter VIII, on the histopathology of the nose and throat, by Andrew A. Eggston. The normal histology of these regions is first described, and is followed by a short account of the physiology. Then comes a full description of all the pathological processes which occur, the portion dealing with tumours being especially instructive. This section forms a unique feature of the book, which is generously illustrated throughout.

DIABETES MELLITUS

Diabetes Mellitus. By Zolton T. Wirtschafter, M.D., and Morton Korenberg, M.D. A William Wood Book. (Pp. 186. $2.50 or 14s.) Baltimore: The Williams and Wilkins Company; London: Baillière, Tindall and Cox. 1942.

This is a difficult book to review on account of its wide and vague scope, almost entirely theoretical. Perhaps it is fairest to let the authors' preface speak for itself. "This monograph is written for the individual who asks what is the nature of the processes that characterize disease, and what is the purpose, and the accomplishable in the treatment of diabetes mellitus. . . . Only a thorough summary of the fundamental principles involved in the metabolism of carbohydrates, proteins, fats, minerals, vitamins, and endocrines in diabetes mellitus can make one independent of 'rule of the thumb' procedures. This review of the extensive literature of carbohydrate metabolism in health and disease can serve no better purpose than to emphasize the pitfalls and dangers of mechanical methods of diagnosis and treatment of diabetes mellitus."

The book devotes successive chapters to all the main physiological aspects and describes most of the recent experimental work and views—not fully enough to serve as a complete work of reference but in an interesting way, especially as regards glycogenesis, ketosis, and acid-base balance, and the vitamins. At the end of the book the authors leave theory and experiments to include two chapters on general treatment and on diabetic coma, too brief to be of much practical value. For coma they recommend glucose and bicarbonate intravenously, normal saline (3 litres) subcutaneously, and 25 units of insulin, 50 mg. of thiamin, and 100 mg. of ascorbic acid intravenously, the last three to be continued intravenously every hour in half-doses. This is a novelty which is neither explained nor justified, and the advice to massage the site of insulin injection seems superfluous with administration by vein.

CIVILIAN HEALTH IN WARTIME

Civilian Health in Wartime. By Francis R. Dieuaide, M.D., Associate Professor of Medicine, Harvard Medical School. (Pp. 328. $2.50.) Cambridge, Mass.: Harvard University Press; London: Oxford University Press. 1942.

Of recent years there has perhaps been a tendency to regard health as precariously balanced on a razor edge, overlooking the fact that, given good conditions of environment, the human body, as W. B. Cannon pointed out, has extraordinarily wide powers of readjustment. But total war changes environment, occupation, and diet for nearly everyone, so that external readjustments are called for. These Dr. Dieuaide of Harvard, in *Civilian Health in Wartime*, has tried to explain to the general public in simple, sensible terms. Naturally he deals with the subject from the American point of view, and many of the statistics given do not apply to this country. At the same time he draws many illustrations from British experiences, and in terms gratifying to our national pride. Reading between the lines, however, we can see that he thinks his own countrymen are still far from realizing the implications of modern warfare as it affects the civilian. Until the war of 1914-18 deaths from disease outnumbered those from wounds; with the rise of preventive medicine and the increase of mechanization the balance has swung the other way, so that "only two infectious diseases, tuberculosis and pneumonia, cause more deaths each year than automobiles." This may be related to the fact that in America families spend 4% of their income for medical care, which is "less than for automobiles, which take over 6%." There are a number of interesting remarks in the course of his argument, such as those on excessive hours of work. "English experience in 1914-18 provides pertinent data. When the weekly hours of male war workers were cut from 63 to 54, time lost for sickness fell by 43%. Among women there was a saving of 52% when hours of work were changed from 62 to 54." This time we seem in danger of forgetting our own former experience. There are some sensible remarks on the superior adaptability shown by women's clothing compared with the unreformed state of masculine attire; and there are still not a few who will agree that "the medical profession has sound reasons for looking askance at proposals which even vaguely suggest a huge national service with a cabinet minister at the top [and] a hierarchy of officials." An excellent epilogue on morale completes a book full of common sense.

Notes on Books

On the death of PAUL SCHILDER, the Society for Psychotherapy and Psychopathology, New York, of which he was the founder and first president, arranged for the editing and publication of his work *Goals and Desires of Man*. It therefore lacks the advantage of a final revision by the author. A convinced Freudian, it is significant to observe that he departed from strict orthodoxy on such matters as the "death wish" and aggression while holding to the Oedipus complex in all its implications, though not a few Freudians have minimized the latter doctrine rather than the former in recent years. There are some interesting analogies drawn from biology, but the psychological studies of Charlotte Brontë, the Duke of Wellington, and Pierpont Morgan are entirely unilluminating. Indeed, the book professes a profundity which it does not really possess. Surely it does not require a prolonged discussion to reach the conclusion that "we cannot evade the assumption that human beings have different gifts," even when backed up by the startling statement that "we have learned in the past years that artistic gifts are almost ubiquitous"! The verbose, heavy-footed style does not add to the attractiveness of a book which, despite its earnest endeavour to put forward a point of view, we found disappointing. It is published in New York at $4.00 by the Columbia University Press, and in London at 26s. 6d. by the Oxford University Press.

Every teacher and student of first aid should possess a copy of *Training in First Aid for Civil Defence Purposes*, A.R.P. Handbook No. 10, a second edition of which is now available (H.M. Stationery Office, price 6d.). It contains some very sound advice—for example,

that indoor and outdoor practices should be held first in daylight and then in the dark. Nothing could be better than the summary of general principles of first aid—that in all cases the first consideration is to save life, the second to deal with shock, the third to prevent aggravation of the injuries, and the fourth to arrange for rapid removal of the casualty. There is an excellent account of the use of faked casualties in teaching. It would be as well to avoid the use of such terms as " compound " for " open " fracture and fracture of the " leg " when fracture of the femur is intended. The use of webbing bands (now included in first-aid equipment) for carrying casualties is described and good diagrams are included, but in suggesting material for improvised splints laths from venetian blinds should not come first. Direct digital pressure upon the actual arterial bleeding point is not mentioned, but the use and abuse of a tourniquet are discussed. The handbook states that in all cases of abdominal wounds shock will be extreme; this statement is somewhat sweeping, for in the absence of such shock an abdominal wound might be overlooked. Nevertheless, this handbook is extremely useful and right up to date.

That a book has reached its ninth edition is sufficient evidence that its subject-matter (repeatedly brought up to date) is sound and that it satisfies a demand from a discriminating public. A careful reading of *Food, Health, Vitamins*, by R. H. A. PLIMMER, D.Sc., and VIOLET G. PLIMMER, confirms this to the full. As the authors state in their preface to this edition, they have discarded " what once seemed good " and embodied " what now proves best." Additions to scientific knowledge of the vitamins and their action on the human body are explained in terms understandable by the non-scientific reader, and excellent suggestions are given for making the best of the wartime diet. The book deserves a better binding, even in wartime. It is published by Longmans, Green and Co. at 7s. 6d.

Preparations and Appliances

A SIMPLE METHOD OF SERUM TRANSFUSION IN THE FIELD

Squadron Leader J. C. McC. BROWNE, M.B., B.S., R.A.F.V.R., writes :

The value of early serum infusion in varying concentrations in cases of shock and exsanguination is now well established. The apparatus here described is designed to facilitate the giving of blood serum to a wounded man under field conditions. It is especially applicable to cases resulting from aircraft crashes

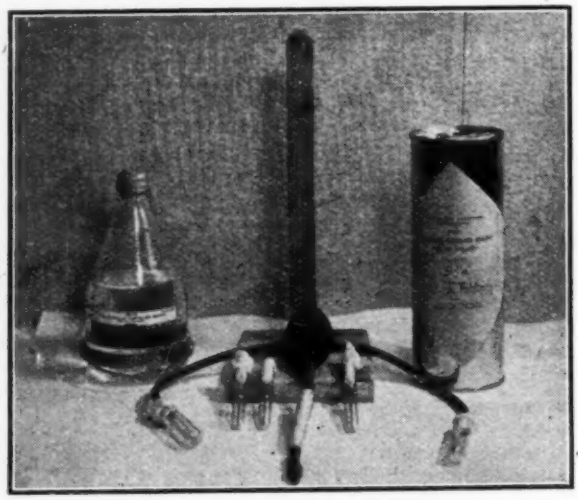

FIG. 1.—Apparatus laid out for use.

in isolated places where there has been delay in reaching the scene or where immediate evacuation to a near-by hospital is not possible. The apparatus (Fig. 1) consists of: (*a*) a standard bottle of dried serum fitted with a rubber cap ; (*b*) a 500-c.cm. bottle of sterile fractionally distilled water, with a rubber cap ; (*c*) a small hand-pressure bulb such as is used on a nasal spray, with two valves ; (*d*) a piece of rubber tubing 15 in. long ; (*e*) four No. 18 gauge needles ; (*f*) a glass adaptor ; (*g*) 1 oz. of tr. iodi mitis ; (*h*) an air filter consisting of a glass bulb filled with cotton-wool. All four needles are protected by packing in glass tubes, and the rubber caps by a wax coating. The bulb, tubing, needles, and adaptor are wrapped in a towel and autoclaved. The entire apparatus when packed weighs 3 lb. 12 oz. and measures 9 in. × 8 in. × 4 in.

Procedure to Introduce Water into the Serum (Fig. 2).—The caps of the bottles are swabbed with iodine after removal of the wax, the cotton-wool plug from one of the tubes being used as a swab. One needle attached to the tubing by the adaptor is pushed just through the rubber cap of the water-bottle, and another on the other end of the tubing just through the cap of the serum-bottle. The third needle is also pushed well through the cap of the latter to allow escape of displaced

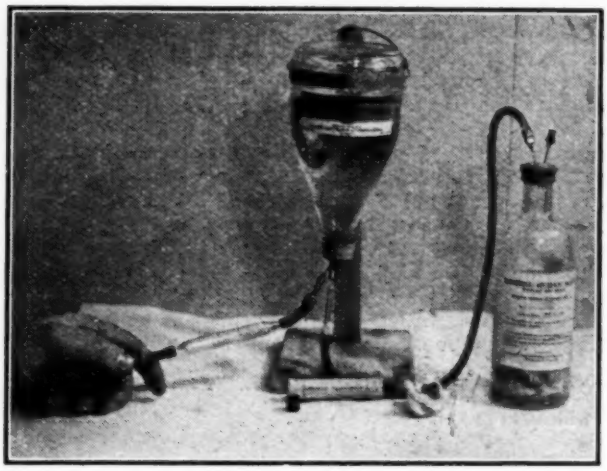

FIG. 2.—Introducing water into the serum.

air. The fourth needle is then pushed through the cap of the water-bottle and the filter and bulb are attached. The water-bottle is then inverted and air is pumped into it until the required amount of water has been displaced into the serum-bottle, which is then shaken until the dried blood serum is dissolved.

Giving the Serum (Fig. 3).—The bulb and filter are transferred to the third needle (in the serum-bottle). The needle attached to the adaptor is removed from the water-bottle, detached, and inserted into the vein in the usual way. The serum-bottle is inverted and serum pumped out until all air is removed from

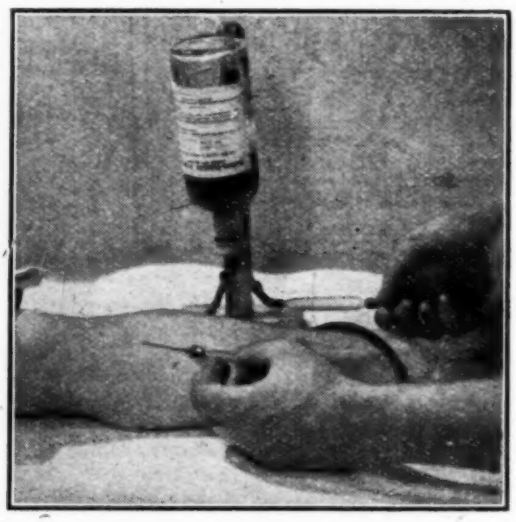

FIG. 3.—Giving the serum infusion.

the tube and adaptor, when the latter is attached to the needle. Serum can then be pumped into the vein.

The following details should be noted : (1) A filter to eliminate solid lumps of serum in the intravenous flow has not been found necessary. (2) In giving the serum it is important that the needle to which the bulb is attached is pushed through the cap to the hilt, the other needle being only *just* pushed through, as otherwise an air embolism may occur, due to bubbles of air passing direct from one needle to the other. (3) With the aid of a small collapsible support for the inverted bottle the whole operation can be carried out by a medical officer single-handed.

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MAMMARY CANCER IN MICE

The rapid advances now being made in our knowledge of the aetiology of breast cancer in mice are exciting widespread interest, which is quite understandable if only because these tumours have been regarded as most typical examples of malignant neoplasms: they are carcinomas arising in glandular epithelium; they are not filterable, though they are transmissible from host to host indefinitely by means of cell grafts, a crucial test of malignancy; and they occur in mammals. The advances have become possible because special strains of mice have now been maintained so long by strict brother-by-sister mating—about 7 years is the necessary minimum—that practically all heterologous genes have been lost and closely related members of a strain are now almost as closely alike as identical twins. In some strains the incidence of cancer of the breast is uniformly high, in others uniformly low; and by such operations as cross-breeding and cross-fostering three major factors have been demonstrated co-operating in the production of these tumours. One factor is an inherited susceptibility; another is some specific element which ordinarily passes from mother to young in the milk; and another is the action of oestrogenic hormones on the mammary gland. Outstanding facts that have to be explained are conveniently illustrated in statements published by Bittner. He observed that in the high-cancer inbred mouse strain A the incidence of cancer of the breast is 96% in females which are allowed to breed freely, but is only 5% in those which are not allowed to breed at all. He observed also that, whilst in breeding females of strain A the incidence is, as just mentioned, 96% in those which have been suckled by their own strain A mothers, it is only 5% in those which have been suckled only on females of the low-cancer strain C 57 black; and, conversely, that in strain C 57 females which have been suckled only by their own strain C 57 mothers the incidence is only 0.5%, whereas it is up to 11% if suckling has been on strain A mothers. With other strains of mice the corresponding figures may be very different, but it would appear that in general the three-factor explanation holds good as a first approximation provided it be recognized that the different factors may vary very greatly in relative importance from strain to strain of mice. Much of the more recent work has been done in America, particularly by Bittner, Andervont, Little, and W. S. Murray, and a detailed knowledge of the present situation may be gathered from the many papers published in *Cancer Research* and in the *Journal of the National Cancer Institute*, both American publications. A comprehensive general review with an extensive bibliography has been published recently by Bittner.[1] All that can be usefully attempted here is a stocktaking statement of what appears to be the more important facts accumulated by workers of established reputation.

Existing special inbred strains of mice fall naturally into two main groups—high-cancer with characteristic incidences near 100%, and low-cancer with characteristic incidences around 2%. Low-cancer strains are of two types: those which, like strain C 57, are low because the individuals are so lacking in sensitivity that tumours develop only under exceptional circumstances, and those which, like strain C, are low simply because in them milk factor is wanting. Bittner has produced a substrain of this latter type, his Ax, by starting from a sensitive strain A female which had become non-cancerous because suckled on a low-cancer C 57 female. Mice of either of these two strains, Ax and C, can form the starting-point of permanent high-cancer lines provided they have been suckled on high-cancer females and so have acquired milk factor. How far significant hormonal features should be regarded as being ultimately only manifestations of genetically controlled hereditary strain characters is an open question. Hereditary susceptibility is a strain characteristic and is transmissible alike by both male and female parents. In Bittner's experiments with strains A and C 57 the mode of transmission was found indistinguishable from that of transmission by a single dominant Mendelian gene; but other workers, using other strains of mice, have found greater complexity. Andervont, for instance, found evidence that multiple genetic loci are involved when he showed that the degree of susceptibility varies with the strain of mouse: hybrids obtained by crossing high-cancer females of C3H strain with low-cancer males of strains I or C 57 or Y had incidences of 100%, 95%, and 71% respectively. Little found that in his mice susceptibility is influenced by several of the known genes. Hardly anything is known of how genetic constitution becomes manifest as susceptibility; whether it is through determination of the chromosomal constituents of mammary cells or by some less direct means.

Bittner has recently shown that by means of a high-speed centrifuge the milk factor can be spun down from extracts of lactating mammary gland, and he has reached the conclusion that very probably the milk factor is a colloid of high molecular weight and may be a virus. The milk factor certainly exhibits some of those qualities of living things which one usually associates with the presence of a virus. The milk may be frozen or dried without loss of potency. The factor is present in the milk of all high-cancer mice, and the fact that the milk remains unchanged in quality and potency from generation to generation indefinitely is taken as evidence that the milk factor must increase in amount, possibly by self-multiplication. The milk acts quantitatively over a certain range of dosage, maximum effect in high-cancer strain A, for example, being reached only when suckling has extended to some 24 hours or when some 2 c.cm. of milk has been given by mouth. Milk may differ in potency from one high-cancer strain to another, but the factor itself is not necessarily strictly strain-specific, since, for example, the milk factors obtained from foster mothers of the two strains C3H and A will both notably increase the incidence of breast cancer in strain C 57 mice. Milk factors, too, from different sources seem much alike in another respect, for none has been noticed producing its own histologically characteristic varieties of breast cancer. The factor is present in the milk of high-cancer strains during the whole lactation period, and mice are known to be susceptible to its influence up to the age of 4 to 5 weeks at least. A number of facts indicate that the milk factor can lie dormant for long periods and may even multiply without ever being associated with frankly cancerous tissue. In high-cancer strains, for instance, the earlier litters are born and receive potent milk long before their mothers reach the minimum cancer age, which is at about 5 months, and there is no indication that such transmission from first litter to first litter, generation to generation, cannot continue indefinitely. The few females of high-cancer strains which remain free from breast cancer to the end of their natural lives commonly transmit milk factor to their suckling young as effectively as other females of their strains. Also, in males

[1] *Trans. Stud. Coll. Phys. Philadelphia*, 1941, 9, 129.

of sensitive strains the milk factor commonly lies latent throughout life unless provoked to tumour-forming activity by prolonged administration of oestrone or similar substance. Practically nothing is known of what is happening to the milk factor during these long periods of apparent latency. There is evidence that the milk factor is recoverable from circulating blood and from spleen of high-cancer mice of pre-cancer age. When young females of high-cancer strain are compared with their own litter-mates which have been fostered on low-cancer females, and have therefore received no milk factor, it is found that the mammary gland shows a richer terminal arborization pattern. There is no evidence that milk factor leaves the body in significant quantity except in the milk. No decided infectious or contagious tendency has been observed in groups of mice living together, and when crosses are made between low-cancer females and high-cancer males continuous presence of the male parent makes no difference to the incidence; he cannot in any way transmit the milk factor he absorbed as a suckling.

If the ovaries are removed whilst the mice are still very young, liability to develop cancer of the breast in later life is reduced. This suggests oestrogenic hormonal factors. The involvement of oestradiol, a natural ovarian hormone, is shown, for example, in the observation that if male mice of sensitive strain—which never develop breast cancers spontaneously—be treated with oestradiol or kindred substances over prolonged periods the incidence of mammary cancers becomes high, attaining in some strains the level of that found in the breeding females. Other constituents of the complex hormonal system of the body are also known to be involved, and there are associated changes in the pituitary gland and in the adrenals. The significant changes which take place in the mammary gland are in some way specific; the fully active lactating mammary gland is not one of the intermediate stages leading to cancer. Little describes how prolonged administration of oestrone produces a gradual hypertrophic change in the mammary gland and how this change progresses steadily until the fully cancerous condition is reached. In advanced stages the changes are patchy in distribution, for in some areas of the gland they proceed more rapidly than in others: in the early period of the frankly malignant condition a cancer may spread more by conversion of neighbouring cells than by multiplication of cells already malignant. Little's findings are remarkably like those described by Sir Robert Muir in his studies of cancer of the breast in women. In mice the milk factor is present in tumour tissue in considerable amounts, as can be shown by feeding tests. Testosterone has an action antagonistic to that of oestradiol, and will reduce the incidence of cancer of the breast if administration is started sufficiently early, but neither oestradiol nor testosterone will affect the growth of an established cancer.

Obviously the story is still incomplete. We cannot yet see clearly the significance which known facts have in relation to the aetiology of mouse tumours in general, or even whether they have significance in relation to all breast tumours of mice. Bittner thinks he has evidence of a second and much rarer type of breast cancer: one which is not generally distinguished from the common type, and which indeed is only peculiar, so far as is known, in the fact that its occurrence is not markedly correlated with capacity to transmit milk factor and produce cancer in the offspring. In considering possible indications for medical procedures in human beings it must be remembered that mankind is a very mixed stock and that the chances that a mother who is producing milk factor—if any ever do—should have a susceptible female child is more remote than among these special inbred strains of mice.

EXPERIMENTAL NEUROSES

No one who has observed the types of war neuroses that may follow exposure to stimuli that threaten danger can fail to be impressed by the similarity that exists, on the surface at least, between some of them and the phenomena of experimental neuroses in animals.[1] In both cases there is a stimulus which has a subsequent effect in producing a state of uneasiness. The human being exposed to air bombing, for example, becomes like the animal in the Pavlovian type of experiment—restless in the presence of anything that reminds him of the original stimulus, with insomnia, irritability, over-sensitiveness to stimuli (including jumping at noises, for example), altered social reactions (such as shyness), apprehensiveness, and visceral disturbances. The same tendencies to improve with a rest away from the scene of action or from the experimental laboratory, as the case may be, and to relapse on return to the old environment, are evident in both instances. The effect of rest, the greater susceptibility of certain individuals, and the relative inefficiency of sedative drugs are all similar. The possible importance of such observations, assuming—and it is still a large assumption—that the similarity is more than an apparent one, is this: that whereas it is necessary to postulate a motive or a wish to escape to account for the existence of symptoms depending on mental conflict, it becomes possible to conceive some symptomatic "neuroses" in fundamentally physical terms—i.e., as the expression of an uninhibitable excitation throughout the central nervous system. This is in accord with (*a*) the occurrence of neuroses after a certain period of time in people of sound morale, this being presumably a fatigue effect, since the first effect of fatigue is probably to loosen inhibition; (*b*) their greater tendency to occur in people of a certain temperament; (*c*) their occurrence in people in whom there is reason to suspect that their inhibitory processes are weak (e.g., certain obsessionals); (*d*) the failure of psychotherapy to do much for this type; (*e*) their specificity—e.g., a man may fly courageously but become extremely unhappy on the threat of air bombardment while on the ground.

There are risks in drawing parallels between dogs and men. It is well known that similar syndromes may have a very different pathology. There is little apparent resemblance between the differentiation of closely similar stimuli, which is the normal experimental condition in animal neuroses, and the frightening situations in which the fighting man finds himself; but, according to Gantt,[2] neuroses exactly similar to those set up by a difficult differentiation can be produced in dogs by exposure to fright. Man does not require to be frightened to develop the phenomena of fear. The "representative-imaginative" function of consciousness becomes the conditioned stimulus instead of the actual situation, so that in war neuroses considered even in this way there is already a psychological factor. It is already a psychoneurosis and not a pure neurosis—i.e., it is not simply a matter of a physical situation resulting in disturbance. But, after all, the same can be said of the experimental animal, in which waiting can also become a conditioned stimulus, as Liddell and Anderson have shown. A psychoneurosis in the strict sense of the term only exists when the individual makes use of the symptoms of physiological disturbance in a social way, either to disguise from himself that he is afraid or to escape from the dangerous situation.

[1] Anderson, A. D., and Parmenter, Richard: "A Long-term Study of the Experimental Neuroses in the Sheep and Dog," *Psychosomatic Medical Monographs*, Vol. II, Nos. III and IV, 1941.

[2] *Amer. J. Psychiat.*, 1942, **98**, 475.

It seems possible, therefore, that certain neurotic syndromes in war may be explained without invoking conflict in the mental plane and without invoking motive either. This would be in harmony with another current observation—that individuals developing neuroses when in a Service do not by any means always, and perhaps not often, improve as a result of discharge into civil life. It has always been tempting to apply Pavlov's observations to human beings, but to do so has seemed sometimes too simple and sometimes too far-fetched. It is possible that too much reluctance has been exhibited in this regard in peacetime. Some clinicians[3] more daring than others have suggested that repeated feverish colds may depend on conditioned reflexes, and that certain cases of sensitivity to food have been similarly explained in preference to regarding them as real allergic reactions. Even some of the more definitely social neuroses (psychoneuroses in the proper sense) might be conceived in the same way. For example, Gardner[4] has described the case of a boy who was always in difficulty with the authorities and has suggested that this boy's reactions to people were conditioned by his early responses to his father. There is at least a field for speculation; and in the war neuroses we have something which more closely approaches the experimental situation, making speculation less speculative.

CAUSES OF BLINDNESS

Over 70,000 persons in England and Wales are certified blind; of all these only 8,000 to 9,000 are employed or employable. The problem of the blind is therefore not only a human but also an economic one. With the stricter system of certification that has been in vogue during the past 20 years or so a mass of valuable statistical data is now available, and an excellent analysis of the material seen in Glasgow and the south-west of Scotland during the period 1929-35 has been presented by a Mr. J. Marshall and Dr. H. E. Seiler.[5] The observations cover 3,219 persons, and show cataract and myopia to be the two commonest single causes of blindness, each accounting for about 16% of the total. Venereal disease comes third with 14%, and other causes of sepsis account for about 11%. Then comes glaucoma with about 9%, whilst congenital anomalies and abiotrophies are responsible for over 7%. Surprisingly enough, injury, even in such a highly industrialized area as that surveyed by the authors, accounts for only 6.4%, though this rises to over 10% if the cause of blindness as it affects the first eye is considered. A clearer picture of the disabling effect and economic importance of the various causes of blindness is obtained if they are considered in a different way. Thus, cataract, which comes highest in the list of causes, falls to the eighth place if "patient-years" are calculated from the duration of loss of sight for each cause and the number of cases in these categories. In this way the significance of injury and congenital anomalies increases considerably. The causes of blindness must also be viewed in relation to the main age groups. In the school period congenital syphilis and non-industrial injury predominate; acquired syphilis is the most important single cause in the age group 16 to 29 years; myopia, too, becomes significant in this particular age group. In the age group 30 to 49 years syphilis and myopia again predominate, and industrial injury, though important, does not rank so high as it does in the preceding age group. At the higher ages degenerative lesions (myopia, cataract, glaucoma, and vascular diseases) account for about 60% of the total. In the group of 70 years upwards cataract and glaucoma account for 67% of all cases. Generally speaking, all causes of blindness fall heavier on males, with the single exception of diabetes, where there was a significant excess for females. The relation of blindness to occupation varies, of course, with different regions. For Glasgow and the south-west of Scotland the incidence was outstandingly high in miners and quarry workers, with textile workers and metal workers next in frequency. A matter of some interest is the fact that myopia does not occur with any significant excess in the various occupations.

Studies of this kind reveal only too plainly that great gaps still exist in the prevention of blindness. It is gratifying to the surgeon to restore vision to an elderly patient suffering from cataract, but the social significance of preventive work in the younger age groups, though less dramatic, is far greater. The control of venereal disease, a reduction of industrial eye injury, a deeper understanding of the various inflammatory and degenerative conditions that lead to blindness are all problems that the ophthalmologist has to face.

[3] Higgins, Harold L., *New Engl. J. Med.*, 1941, **225**, 772.
[4] Ibid., p. 775.
[5] *Brit. J. Ophthalmol.* ,1942 ,Aug., Sept., and Oct.

BOVINE BRUCELLOSIS

The close relation of medical and veterinary sciences imposes on the medical man the duty of keeping in touch with advances in the control of animal diseases. At a recent discussion arranged by the Parliamentary and Scientific Committee on the compulsory pasteurization of milk Wilson[1] stated that an average of 5 to 10% of farms sent out milk containing tubercle bacilli, and 20 to 40% milk containing *Brucella abortus*—both infections deriving from diseased udders. In 1937 Brockington[2] estimated that three-fourths of the milch cows in this country would at any one time be found excreting one or more of the organisms, *M. tuberculosis*, *Br. abortus*, and haemolytic streptococcus, in virulent form. While this view may be an exaggeration, there can be no question about the extent and seriousness of the problem, which is, in the first instance, one of economics and animal husbandry. Efficient pasteurization of the milk supply is essential to ensure safety for the consumer, but this should be accompanied by other measures designed to obtain clean milk and to reduce the incidence of disease among dairy herds. Tuberculosis has received a good deal of attention as one of the chief wartime problems, but veterinary surgeons are also seriously concerned about contagious abortion, which causes considerable loss to farmers from abortion, infertility, and diminution in the milk yield. The true incidence of undulant fever (brucellosis) in man is uncertain owing to the number of undiagnosed cases and the probable large number of ambulatory or mild cases. A useful article on the clinical aspects of the disease was recently contributed to these columns by Dr. D. G. Leys.[3]

Contagious abortion presents unusual difficulties in diagnosis as well as eradication. Infection in animals would often appear to be light, and it may be many weeks or months before agglutinins appear in the serum. A special difficulty in any policy involving the slaughter or segregation of the positive reactors is that many animals in a herd may be infected but still negative to the test; on re-test at some later date non-reactors may then be positive, having in the meantime aborted and spread infection. If infected stock are sold in the open market, infection is disseminated to other herds. Under a new scheme which came into force on June 1 of last year the farmer may pay an annual premium for veterinary supervision, one

[1] *Lancet*, 1943, **1**, 25.
[2] *British Medical Journal*, 1937, **1**, 667.
[3] Ibid., 1943, **1**, 187.

of the benefits being free inoculation of his cattle with vaccine approved by the Ministry of Agriculture.[4] A. D. McEwen, in a recent review of the main facts about control by vaccination,[5 6] states that ordinary dead vaccines are useless, and that living vaccines prepared from non-specified strains or from strains which have not been studied experimentally give variable results from time to time; they may infect an undue proportion of the vaccinated animals and should be avoided. He also states that the question of virulence is now receiving official attention, and the attenuated smooth "strain 19" used extensively in the U.S.A. and the rough strain 45 (20) of McEwen are both approved as live vaccines by the Ministry of Agriculture in this country (Standard Vaccines, Nos. 1 and 2). Both these vaccines give a useful degree of immunity, but No. 2 has the advantage that it does not produce agglutinins to confuse subsequent tests of infection. No. 1 vaccine is recommended as a single dose for calves and young non-pregnant cows, revaccination being done at the discretion of the veterinary practitioner, whereas No. 2 is reserved for administration in two doses to older non-pregnant animals. American veterinary surgeons do not usually revaccinate; they hope that a single dose of vaccine to the calf will protect the animal for life. McEwen points out that as No. 2 vaccine does not even cause positive reactions to the agglutination test, there is much to be said in favour of repeated inoculations, about once every twelve months, when the animals are non-pregnant. We question whether official regulations should not stress these "re-call" or "boosting" doses, which have been invaluable in human immunization.

According to Gilbert[7] dead vaccines in an oily excipient have given promising preliminary results in goats and cattle. Felix has suggested that the superiority of such vaccines over ordinary dead vaccines is due to the oil protecting some essential antigen which would be destroyed in the presence of water. The use of dead vaccines obviates one possible disadvantage of live vaccines even of reduced virulence—namely, the risk of infecting the inoculated animal. In view of the variable nature of the disease, field trials with Gilbert's and other types of vaccine should be on a sufficiently wide scale; if successful, the use of a specific vaccine might with advantage be made obligatory on all owners of breeding cattle. It may, however, be asked whether veterinary surgeons, laboratory workers, and stockmen could be safely and efficiently protected with some specially prepared heat-killed vaccine. As regards chemotherapy, sulphanilamide and other compounds have given some promise in the treatment of undulant fever in man, but the results so far obtained in contagious abortion in cattle have been very disappointing.

PHYSIOLOGICAL GASTRECTOMY FOR DUODENAL ULCER

A recent paper by T. H. Somervell[8] describes a new method of dealing with duodenal ulcer. The author introduces us to what he calls physiological gastrectomy, which does away with hyperacidity without the operative risk gastric resection always carries with it and which causes it to be often withheld from the sufferer from duodenal ulcer. It is well known that in a case of old healed duodenal ulcer with a large stomach gastro-enterostomy is eminently successful, but in a case of active ulcer associated with a small hypertonic stomach and hyperchlorhydria this operation may produce new ulcers for old by giving rise to anastomotic or jejunal ulcers, so that the last state of the patient is worse than the first. The object of surgical treatment in this type of case must be to reduce the hyperchlorhydria as well as to divert the gastric contents, and hitherto the only effective way of doing this has been by partial gastrectomy. Somervell produces convincing evidence that ligature of the gastric arteries will so lower the acid concentration as to obviate the undesirable effects hitherto attendant on gastrojejunostomy for the active ulcer with hyperchlorhydria. By a combination, therefore, of anastomosis with ligation—a comparatively simple and safe procedure—the patient may be given complete relief without undergoing the ordeal of gastrectomy, with its risk and liability to subsequent complications such as anaemia. The author of this paper, which comes from a London Mission Hospital in Southern India, states that he has personally performed over 2,000 operations for duodenal ulcer. Economic conditions around the Mission are such that dieting and medical treatment are not practicable, and surgery must be used to render the poor native patient fit to resume his staple diet of curry and rice or curry and tapioca. Perhaps the chief appeal of this paper is the advantage which this innovation in surgical technique would appear to offer over the more mutilating procedures at present in vogue.

[4] *Lancet*, 1942, **1**, 621.
[5] *Vet. Rec.*, 1942, **54**, 287.
[6] Ibid., p. 487.
[7] *Proc. roy. Soc. Med.*, 1943, **36**, 153.
[8] *Brit. J. Surg.*, 1942, **30**, 113.

A NEW JOURNAL

The *Health Education Journal* (1s. 6d.), which has just been issued, is a quarterly periodical published by the Central Council for Health Education. It replaces the former *Health and Empire* of the British Social Hygiene Council. It is perhaps not quite clear for whom this journal is intended, but it is presumably more for the increasing number of lay workers who now interest themselves in health problems, and for teachers, than for medical men. The doctor will, however, find much to interest him in the current number, and especially will get some idea of the sort of problems that are facing those who are valiantly trying to lead people into hygienic paths. An editorial introduction is followed by a report of an interview between the Editor and the Minister of Health, who says that the function of the new journal is "to act as the guide, counsellor, and friend of all those concerned with promoting the health of the people." Another recorded interview of interest is one with Dr. Allen Daley, Medical Officer of Health to the L.C.C. and one of the pioneers of health education in this country. Dr. Daley makes a valuable point when he says that the results of the different methods of health publicity should be assessed by mass observation methods. Other articles include one by Dr. Charles Hill on the "Radio in Health Education," by Prof. Mackintosh on "What are We Trying to Do in Health Education?", by Dr. Harley Williams on "Making Health Films," by Sir Drummond Shiels on V.D. publicity, and by Dr. L. J. Picton on the function of the general practitioner. The point should perhaps be made that, however effective the various ways of conducting health propaganda may be—radio, film, booklet, leaflet—none of these can compare with the most important medium of all, the general practitioner of medicine. It is he who really has the ear and the confidence of the men and women who seek his advice. One function of health education would therefore seem to be to provide solid information on various aspects of health that would be of interest to the general practitioner, who has little time to collect facts and figures but is the best person to make use of these in persuading those with whom he comes into contact to seek for health.

THE PRE-CLINICAL YEARS

WITH SPECIAL REFERENCE TO THE TEACHING OF PHYSIOLOGY

BY

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The purpose of this article is to examine the problem of pre-clinical instruction and to plead for a more imaginative treatment of it, and this with special reference to the teaching of physiology. There is no more pressing problem in the whole of medical education than the nature of the instruction in the pre-clinical years. An increasing weight of opinion, expressed in the medical press and in speeches, is stressing the need for bolder and more honest efforts at bridging the gap between the pre-registration science course and the clinical stage—that is, for making the Second M.B., B.S. of greater value to the student. Great strides have been taken in some of the more progressive medical schools, but if the textbooks are any criterion a more sweeping policy is called for. Are those in whose hands the instruction lies rising to the occasion and responding to the increasing demand for truly pre-clinical teaching?

It is a somewhat disquieting experience to compare what one might call the spirit of the "Resolutions of the General Medical Council in regard to Professional Education adopted on May 29, 1936," with the spirit of the average physiological textbook recommended for medical students. If the former be studied (pp. 3 and 4) it will be seen that the emphasis has shifted tremendously towards the clinical in pre-clinical instruction, and that the teacher is given the widest possible scope and freedom of presentation. So marked is the divergence of accepted pre-clinical teaching from this standard that we find the leaders of the profession putting forward a most earnest plea to the teachers of anatomy and physiology to mend their ways. The masterly summing up of Lord Horder (1939) calls for extensive quotation:

". . . Of the prospective doctor's pre-clinical work I have said again and again that the motto should surely be *Respice finem*. I think we saw an unfortunate setback when the medical schools decided to put pure anatomists, pure physiologists, and pure chemists at the head of their departments. Each professor has quite naturally wished to stake out his claim and make it as large as possible. The position has been partly redeemed during recent years by a closer association of the heads of the departments with their clinical colleagues in the college committee. . . .

But it is in the teaching of physiology especially that we still see too much cleavage from the later clinical work. The transition from the first to the second of these two parts of the student's work should be much less abrupt than it is. Indeed, it is not at present really a transition at all; it is almost a complete break. After all, what is disease except a state of morbid physiology? . . .

Yet that utter strangeness, that scared and helpless look, in a new-time clinical clerk, which too often remains with him for several weeks or months, what does it mean unless this—that there is in his mind the thought that he is about to embark upon an entirely new voyage for which he is quite unprepared? To change the metaphor, his approach to the patient is as to a strange animal which he has never yet met, and whether the issue will be fraught with a peaceful or bellicose issue he cannot say. It *is* a strange animal that we face him with, physiologically, psychologically, and, even in great measure, anatomically. . . . Until we succeed in bridging this gulf we shall not effect a real improvement in our present system. . . .

With regard to the use of various instruments that are absolutely necessary for the purpose of the routine examination of the various parts of the body, I long ago advocated that the technique of these should be mastered early—that is, in the physiology classroom. I referred to the stethoscope, the laryngoscope, the auriscope, the ophthalmoscope, and the blood-counting apparatus. . . . The larynx is a natural object in health, and the trick of seeing the vocal cords should be learnt as part of the physiological training; once learned it is not likely to be forgotten. It is the same with the retina: this is a normal structure, and how does one see it except with the ophthalmoscope? But when I ask a new clerk to look at an optic disk he excuses himself on the ground that he is unfamiliar with the instrument. But it is quite likely that he knows a great deal about the theories of colour-blindness, or did when the fear of meeting the question at an examination was upon him. . . . And, in the same sense, if time presses, as we know it does, would it not be a good exchange to omit the study of the minute structure of the organ of Corti, and to learn how to see the drum of the ear? A great deal of my time in the wards was taken up in teaching first-time clerks this physiological routine. This should not be the best use that can be made of a physician who is supposed to be experienced in clinical methods and in the arts of diagnosis and treatment. . . .

These examples of the ignorance of the normal at the time of entering the wards and the out-patient departments do not end with lack of acquaintance with simple instruments. The means by which the erect position is maintained and the mechanism of the normal human gait are generally quite unknown subjects. The significance of the knee-jerk and ankle-jerk, and even the method of eliciting them—normal things again—are nearly as foreign to most students at the end of their physiological training as is the use of the instruments to which I have just alluded. . . . This lack of preparedness for clinical instruction causes the student to advance a very little way indeed during his first clerkship. . . . If these and several other *ad hoc* matters in physiology and anatomy are to be included and emphasized during the pre-clinical days, it is clear that some things must be shortened or excluded. The selection of these should be made by a joint committee of all teachers interested, not merely by those who teach the subjects which require curtailment. It should not then be a very difficult matter to come to some satisfactory conclusion. . . ."

No more comprehensive or more progressive pronouncement on what pre-clinical teaching should be has been made, and Lord Horder's main thesis relating to staff and to the content of the teaching cannot be too often reiterated. A few of the salient points from our experience at the Rangoon Medical College under these two headings will be given.

The Question of Staff

In the Rangoon Medical College the chairs of anatomy and physiology are in peacetime filled by Indian Medical Service officers with several years' experience in general medicine and surgery, and surely this should be axiomatic in all such appointments, except perhaps in the provinces of biochemistry and of histology, though even here a strong medical bias is essential. In a number of medical schools such an opinion will be looked upon as sheer heresy. But how, otherwise, is it possible to feed to the pre-clinical student that meat which will prepare him for his clinical activities? The pre-clinical teaching needs to be clinically alive, and this will rest on the teacher's personal clinical knowledge and his ability to inject this in provocative doses into the pre-clinical subjects. He needs to approach his task with sufficient breadth of vision to ensure the retention of essentials and the presentation of the matter from what will be fundamentally a clinical viewpoint.

It would seem that the medical schools should steadfastly set their face against their pre-clinical teaching remaining solely in the hands of the "pure scientists." This applies to organic and physical chemistry as much as to other subjects. The pure scientist in any branch of the subject tends to demand from the student a far too detailed knowledge of that branch.

The Content of the Teaching

Surely we need so to teach the pre-clinical subjects that the student will later look back on his two years with real appreciation of their value to him. Is it rare for the fourth-year student or the senior qualified man to regard his pre-clinical years as rather something which he was glad to be done with and to feel that these two years of hard labour were largely wasted? It is not unknown for the pre-clinical years (which can be made such a dreary drudgery) to be looked back on with a certain bitterness, tinged with a wry amusement. If Lord Horder's motto, *Respice finem*, were truly observed this state of things could never arise.

But the voice of discontent is largely inarticulate: the practitioner soon becomes too concerned with immediate problems to feel the lot of the next generation of students on his conscience, and the student is too bewildered even to realize that he is not being taught on the right lines. Indeed, this article is largely an appeal to the teacher to put himself more

often and more sympathetically in the student's place—upon whom the increasing developments of modern medicine already "bind burdens grievous to be borne," without the pre-clinical teacher adding unnecessarily to these burdens. There is something inhuman about a teacher whose notion of preparing a student to deal with such problems as infant feeding or the aetiology of jaundice is to initiate him into the mysteries of chronaxie, the arginase system, or the Hamburger effect. If the net result of the two years' work is the entry into the wards of students flagging in interest and in energy its object is wholly defeated.

There is sure to be an outcry from many quarters at the suggestion that the pre-clinical course is overburdened. It is contended that a drastic pruning of the traditional subject-matter amounts to "spoon-feeding" the student with dogmatic and ready-made examination material; but the fact is, that the student will find abundant stimulus for his reasoning faculties throughout his whole course—that is, to give him an education in the widest sense—and the more abstruse details of anatomy and physiology can soon be mastered by those requiring them for higher studies. The pre-registration subjects alone provide ample opportunity for the inculcation of the scientific method and habit of thought. The principle of pruning, of course, lends itself far more readily to physiology than to anatomy, where it seems at first sight that the subject can be taught only as a whole. But it should not pass the wit of man to devise some way of lightening the task of the student.

There is one point which is often overlooked in the discussion of educational problems, and that is, that the atmosphere and content of the teaching depend not at all upon the curriculum "as advertised" but upon the individual teacher's interpretation of that curriculum. An admirably detailed description of a progressive physiology course has been given by Lee, Boissard, and Hines (1940).

The Case of Physiology

A few salient points from our experience in the Rangoon Medical College in regard to the teaching of pre-clinical physiology will be given. Experience has shown the need for close collaboration between the teachers of anatomy and of physiology, and this for several reasons. It is plainly desirable that any discussion of the function of a system or organ should, where feasible, be preceded by the anatomical study of that system or organ, especially where the nervous system is concerned. Furthermore, overlapping—as, for example, in the case of the tracts of the cord and in the case of the internal ear—can be avoided.

There is nothing original at Rangoon about the general lay-out of the two years' work. As in most medical schools, the first year's programme includes organic and physical chemistry: perhaps we may look forward to the time when this subject becomes part of the pre-registration curriculum. It is taught in the department of physiology by the lecturer in biochemistry, being merged into the later biochemistry, so forming an integrated whole—"physiological chemistry."

During his first three months in the department the student is naturally a good deal preoccupied with the necessity for passing the examination in organic and physical chemistry; for this reason we do not overburden him at first with physiology; for the first two months he is given a preliminary course covering in the simplest possible terms the whole range of the subject. At the same time he is doing practical work on the blood cells. The succeeding lectures deal with each system in detail: first the blood, then the excitable tissues, reflexes, autonomic system, and the circulation, in that order. This order has been deliberately chosen; it is found convenient to begin with the blood, as it is a section of physiology demanding less knowledge of anatomy and biochemistry than any other. In less degree this applies to the other sections mentioned; at the same time the studies of muscle and nerve, the reflexes, and the autonomic system form necessary preliminaries to that of the circulation. This completes the lecture work of the first year. Meanwhile the practical work has comprised the whole of histology (taught largely with a projector) and a course in "first-year" biochemistry.

The arrangement of the theoretical work of the second year is less of a problem, since the student is now beginning to be able to dovetail one system into another. The central nervous system is studied comparatively late in the second year in order to ensure that all have completed its dissection. Every sixth lecture takes the form of a demonstration on a patient of some aspect of physiology. The selection of suitable types of case for these demonstrations may be regarded as one of the most important of the teacher's duties. The practical work in the second year comprises more advanced biochemistry (largely quantitative estimations, as of the blood sugar) and "experimental physiology." The latter consists of the simpler muscle-nerve experiments, followed by instruction in the handling of the diagnostic instruments; the students are encouraged not to be content until they have mastered the knack of seeing the vocal cords, the fundus, and the tympanum. Where possible, the practical work is arranged to keep pace with the lectures.

There is a very deliberate effort to make the atmosphere of the department a truly pre-clinical one in the full sense of the term. The medically qualified members of the staff are expected to spend a few hours every week in the wards and to keep in touch with the medical journals, to prevent their drifting into a narrow departmental groove. Woven into the texture of the lectures and practical work are clinical procedures, terms, and nomenclature. Illustrations are taken, where possible, from simpler abnormalities of function rather than from solely animal experiments. Of all the hundreds of possible examples, two may be given. In discussing the functions of the cerebellum a far truer picture of their somewhat indefinable nature can be given by noting the results of a chronic lesion of one lateral lobe rather than by dwelling on the effects of extirpation in animals. Then in lecturing on the functions of the duodenum it would seem natural, indeed obvious, to speak in parenthesis of the operation of gastro-enterostomy and the new state of affairs thereby mechanically produced.

It is thus from the outset impressed on the student that disease is itself a "state of morbid physiology." This promise of (clinical) things to come is calculated to introduce the stimulus of genuine interest into the pre-clinical course and to bring it into perspective with the succeeding stages of the medical curriculum. The student will pass on to the Third M.B., B.S. work already accustomed to think in terms of "the patient" and familiar with the clinical outlook and with many typical clinical problems.

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MEDICAL AID TO THE WOMEN OF INDIA

The greatest difficulty which the hospitals of India are facing, according to the latest report of the Countess of Dufferin's Fund for supplying medical aid to Indian women, is the shortage of sisters and staff nurses owing to the demands of the Army. When it is considered that there are as yet only 5,000 registered and fully trained nurses in the whole of India as compared with twenty-one times that number in Great Britain, and that many of these have been trained in small, poorly equipped hospitals, it says a great deal for the work that the hospitals have been able to carry on at all, not only caring for the patients but training pupil midwives and nurses. Two new hospitals have recently been opened, the Alice Horsman Memorial Hospital at Cawnpore and the Lady Sandeman Hospital at Quetta. Particulars are given in the report of the 23 hospitals under officers of the Women's Medical Service. The largest of these is the Lady Hardinge Medical College Hospital at New Delhi, with 345 beds, staffed by 10 members of the Women's Medical Service, with 2 others in training, and 21 assistant surgeons. During the year 2,493 operations were carried out at that hospital, and in the obstetrics and gynaecology unit 1,265 midwifery cases were received and 447 obstetrical and 786 gynaecological operations were performed. The next largest hospitals are the Lady Dufferin Victoria Hospital, Calcutta, with 177 beds, and the Lady Lyall Hospital, Agra, with 155. Reference is made to the difficulties resulting from the lack of understanding of modern medical needs by some of the municipal and other members of hospital managing committees. In most of the municipal hospitals very low fees are charged, because it is considered that taxpayers and their families are entitled to free treatment, and thus well-to-do patients take advantage of the facilities offered.

Reports of Societies

PREVENTION OF ACUTE PYOGENIC INFECTIONS OF NOSE AND THROAT

At a meeting of the Section of Laryngology of the Royal Society of Medicine on March 5, Mr. V. E. NEGUS presiding, a discussion took place on the prevention of acute pyogenic infections of the nose and throat.

Methods of Spread

Prof. A. FLEMING said that the nose in health was more or less sterile except for the anterior nares, where there was a quite simple flora as a rule. Staphylococci were found in the anterior nares of 90% of infants in hospital, in 56% of young children, and in from 20 to 40% of adults. An investigation of students and nurses showed 25% of them to have pyogenic staphylococci in the anterior nares, and among out-patients generally a proportion as high as 75% was found. The post-nasal space contained more bacteria and the tonsils had an abundant flora. Certain antibacterial substances occurred in the respiratory tract, notably lysozyme.

Methods of spread of infection were varied, but all depended on the expulsion of the infective agent from the nose or throat into the air or on to clothing, etc., from which it might pass to someone else. It was always found in infectious diseases wards that after beds were made, especially if they were made violently, there were far more organisms in the air than before. It had been stated that 70% of scarlet fever patients became infected in hospital with a streptococcus other than the one they took in. If the instructions in M.R.C. Memorandum No. 6 on the dressing of wounds were obeyed there would be less cross-infection. Many masks worn were quite ineffective. The American system of sterilizing the air with ultra-violet light seemed in some circumstances to work extremely well, but in others not so well. Persons liable to infection could be immunized up to a point, but it was not practicable to increase the resistance of everyone who might be exposed to risk. Resistance could be increased by watching for and dealing with any abnormality that increased the likelihood of infection. A sulphathiazole snuff was offered as a means of getting rid of staphylococcal and streptococcal organisms in the nose, and in some cases it seemed to do what was claimed for it. Sulphapyridine had been made into a chewing-gum, and it was found that after two hours' chewing there was an appreciable amount in the saliva, so that a wash of sulphapyridine was obtained over the tonsils for a long period. An important principle in prevention was the education of the nurse in bacteriology.

Clinical Aspects

Mr. E. D. D. DAVIS said that isolation was often impracticable and too expensive in personal restrictions to receive general adoption, but more could be done to prevent infection than was usually the case. Greater efforts could be made to prevent streptococcal infections in schools. Isolation in schools and institutions was practicable, and the wearing of masks for the nose and mouth in and out of the sick room should be encouraged. The study of aerobiology was an important adjunct to public health, and included the ventilation and air-conditioning of public rooms and the purification of air by ultra-violet light, and by chemical means such as a harmless spray of propylene glycol.

It was stated that streptococcal infections of the nose and throat had an incubation period of from two to four days, but for how long a streptococcal patient was infectious was not known. It was suggested that he was a source of infection during the period of fever. The immunity produced by anti-catarrhal vaccines was said to be from 7 to 12 months. On the question of the carrier, haemolytic streptococci could be found in the pharynx or nasopharynx for as long as six weeks after a cold, equally in patients who had had their tonsils enucleated and in those who had not. The throats of 100 normal students were investigated bacteriologically every month, and an average of 15 to 20% were found to be carriers of haemolytic streptococci. Enucleation of the tonsils simply because the patient was a carrier was useless. If the carrier was sent away for a fortnight the streptococci usually disappeared, but this meant a serious depletion of nursing and medical staff. Gargles, antiseptic swabbing, sprays, and lotions had little effect, and so the wearing of a mask was enforced. A spray of 5% sulphathiazole was being tried.

As for the prevention of infection before, during, and after operations, tonsil and adenoid operations for children should be avoided during so-called influenza epidemics, which were common in January and February. If the temperature of the patient was above 99° F. on the evening or morning a deliberate operation should be postponed. A clean mouth was a necessity. Carious and loose teeth should have received attention. The use of a tooth brush and mouth wash immediately before operation was often overlooked. At operation unreasonable trauma of nose and throat by curetting and tearing was to be avoided.

In considering the post-operative state the construction of the hospital ward was important. Ear-nose-and-throat wards should not contain more than 12 beds, supplemented by single rooms for isolation of cases. The wards should be divided into groups of 4 or 2 beds by fixed glass screens reaching to a few feet short of the ceiling, and the beds should not be less than 6 ft. apart. An adequate number of small side-wards for septic cases was essential, and a solarium or recreation room with access to a balcony was most desirable. The operation case was much better without lotions, sprays, and gargles, and the operation wound should be left alone.

Discussion

Mr. V. E. NEGUS said that at Horton Hospital an interceptor mask of very simple construction—merely a piece of *x*-ray film on a wire frame—had been introduced and had proved very effective. At all events it prevented organisms from being directed straight into the pharynx or nose of the receiver. It was possible for a so-called carrier to be a carrier only at certain times—as, for example, immediately after being in contact with a patient who had some streptococcal infection. Mr. W. M. MOLLISON spoke of the uselessness of the usual gargle. The only method by which the tonsil could be reached seemed to be the sucking of lozenges or the use of chewing-gum.

Mr. T. B. LAYTON said that beds should be at least 10 ft. apart, and in the construction of any new ear-nose-and-throat ward he would demand 12 or 15 ft. On the question of isolation, he said that this method was the limitation of the freedom of the individual for the benefit of the community, but unless there was no doubt at all that it was for the benefit of the community the individual should not have his freedom limited. In convalescence isolation was harmful for the patient. He did not think that any child should be submitted to solitary confinement under the name of isolation for a longer period than three weeks. There was no doubt that mental influences lowered the powers of resistance of the individual to infective organisms, and one of these influences was the unhappiness which attended isolation. Mr. R. G. MACBETH described the construction of a hospital in which abundant provision had been made for bed spacing and for glass screens, and said that the result had been greatly to diminish, even to insignificance, the percentage of cross-infection. An experiment with air-conditioning had shown that after the air was conditioned the number of colonies of micro-organisms had diminished to one-tenth.

Mr. LIONEL COLLEDGE said that he had had several midwifery students sent to him who had been prevented from carrying out their midwifery course because they were carriers—not, apparently, transitory carriers in the manner described by Mr. Davis, but having a carrier period lasting for at least three months. The only thing to be done was to remove the tonsils, and, so far as he knew, it had succeeded, but it was a serious thing to subject anybody to an operation, however trivial, for other than a medical reason. Mr. EWART MARTIN said that the nasal mucus was a most important part of the barrier system against air-borne infection and could be destroyed by the use of antiseptics and also by the use of oils. Dr. D. J. GUTHRIE suggested that the use of animal mucus—mucin—as an antiseptic might be tried. Prof. FLEMING, replying to this last point, said that if it was required to infect animals with the staphylococcus for experimental purposes the thing to do was to put the organism in mucin. These organisms did not infect in small doses without mucin. The mucin offered for use in medicine was not, of course, the substance as it came from the animal; it had been treated in various ways, quite enough to destroy any ferment, before it became the commercial mucin. A good deal of work had been done on the lysozyme content of animal mucin, which had been published in the *Journal of Experimental Pathology*.

Correspondence

Free Choice of Doctor

SIR,—As a practising doctor of nearly fifty years' experience, to whom future medical arrangements will make very little personal difference, I should like to support Dr. Lindsey Batten's, Dr. MacWilliam's, and your own attitude to this problem of the personal relation between the doctor and his patient in contrast with the very undemocratic view that some representative body is more competent to choose his personal adviser than is the individual himself. Indeed, this alternative to the democratic method of individual personal choice has a nasty taste of present-day Germany. As Dr. MacWilliam put it: "We want, before every other professional consideration, freedom to function as doctors in response to the demands of our patients, and to the satisfaction of the persons immediately concerned." In your leading article of February 13 you say that a complete medical service, including consultant and other services, should be made available for nine-tenths of the population; and you say further that the Beveridge proposal is that such a service should be available to the whole population, rich and poor alike. You add: "Whether the compulsory insurance scheme should cover 100% of the population, or only, say, 85 to 90%, is a matter which Parliament has not yet decided or even discussed. Whatever the people of this country, through their representatives in Parliament, may decide on this issue of coverage, it would be undemocratic, not to say foolish, for the medical profession to run counter to the rest of the community. . . . But the doctors of this country do not believe that it is in the public interest that the medical profession should be turned into a whole-time salaried civil service, with the doctor the servant of the State. The doctor must be the servant of his patient."

The panel method of preserving the maximum right of the individual in matters other than the economic one was, and is, a most interesting experiment, but it has never had a fair chance and has had to bear on its shoulders all the faults and limitations of the compulsory health insurance Acts and regulations. It is no fault of the panel system that the working man's family is left unprovided with any medical service; or that the working man himself should have no statutory right to specialist treatment of any kind, or to institutional provision, however urgently necessary these may be. As Dr. Batten—whose claim to a hearing has been well demonstrated by his previous expressions of that rare quality, common sense—puts it: "Our private patients are not always good judges of doctors or doctoring, but this can be said for them: in general they demand from us the best we can give. . . . So far the State, as an employer of practitioners, does none of these things, and it shows no sign of repentance or intention to reform. Its only standard of excellence is that which produces no complaints."

Here are a few quotations from non-medical critics with widely different critical standpoints. The first is by Barbusse, who wrote: "The human reality is the individual . . . and every collective organization of men must come back to the individual man, be quickened by the individual life, and respect individual autonomy to the fullest possible extent." And here is Mr. Cole: "A human being, as an individual, is fundamentally incapable of being represented. He can be represented only in relation to some particular purpose or group of purposes." It has always seemed to me that the importance, even the sacredness, of the individual, and equally of his rights, duties, and responsibilities, is the very essence of the Christian-social ethic and of real democracy.—I am, etc.,

London, E. HARRY ROBERTS.

Rehabilitation for Skin Cases

SIR,—In your interesting leading article (March 13, p. 322) you emphasize that rehabilitation must now be regarded as reaching far beyond the province of physical medicine and as including "occupational therapy, vocational training, and the arousal and maintenance of mental interests." This prompts me to draw attention to a field of rehabilitation which is seldom considered—namely, the rehabilitation of dermatological cases.

Those who are not in close contact with dermatological work often fail to realize the degree of depression to which many skin cases are prone; not only is depression engendered in the patients' minds by the fact that they are diseased, but the nature of their disorder (which may make them repulsive to themselves and shunned by their friends) may cause much psychological injury; to this is added the anxiety that, because of chronicity or the tendency of the eruption to relapse, they may not be able to continue to earn their living by the work in which they are trained. Because of these and other anxieties many patients endeavour to supplement the treatment ordered by their doctors by such homely remedies as the frequent use of antiseptic soap or sun-bathing, which, although employed with the best of intentions in order to "harden" the skin, frequently cause havoc and still further increase the period of disability.

If the sphere is to be enlarged so that by rehabilitation is meant a period of retreat from which the patient returns to the world not only improved mentally and physically but also armed with information culled from systematic teaching at the rehabilitation centre as to how he may best avoid the hazards of his occupation and his environment, then rehabilitation should have a wide application in dermatology. Regarded merely from the economic standpoint it may be found to be a paying proposition for certain types of infective and sensitization dermatoses; regarded from the ethical standpoint it will be of inestimable benefit to many.

It may be of interest to note that as a result of the facilities granted by the Ministry of Health and the War Organization of the British Red Cross Society and Order of St. John, a rehabilitation centre for military skin cases will soon be opened. It is hoped that by suitable rehabilitation the invaliding rate of certain types of cases from the Army will be reduced; that in cases in which mental depression is retarding progress the atmosphere and environment of the centre will rapidly cause improvement; and, finally, that from a study of the problems which will arise in this branch of rehabilitation much useful information will be obtained.—I am, etc.,

R. M. B. MACKENNA,
Lieut.-Colonel, R.A.M.C.

Scientific Freedom and Social Medicine

SIR,—Some of the statements in Dr. Geoffrey Bourne's article (Feb. 20, p. 227) are clearly fallacious, but some contain that modicum of truth that makes generalizations from them particularly dangerous. Dr. Bourne writes: "There are in existence at the present time two types of medical service—the autocratic as typified by the L.C.C. and E.M.S., and the democratic as typified by the voluntary hospitals." The decision as to whether a service is democratic or not must obviously depend upon what we mean by democracy. If we regard a hospital as an institution run exclusively for the benefit of the doctors or its staff, then clearly to be democratic these same doctors must have complete control. If, on the other hand, we think that the primary duty of a hospital is the care of the patients in it, then, I submit, to be democratic the final decision on all matters must rest, not with a small percentage of the workers in that hospital—that is, with its medical staff—but rather with the representatives of its potential patients—that is, with the public.

It goes without saying, I hope, that nothing must be allowed to abrogate the duty of each individual doctor to do his best for each individual patient under his care. Moreover, I think that at every hospital there should be a committee of the medical staff through which individual and collective viewpoints can be expressed and transmitted to the governing authority. Nevertheless, there must be some relativity, and no one is likely to blame a hospital board if more notice is taken of the advice of Dr. Bourne than of his junior house-physician, assuming that Dr. Bourne's house-physician has access to the committee. Similarly on matters of general hospital administration, the opinion of the medical superintendent of a municipal hospital is likely to be of greater value than that of a junior officer of less experience.

Of course, the work of junior medical officers in municipal hospitals is under a degree of supervision and even control by senior officers, but it is to be hoped that the same is true of house officers, clinical assistants, etc., in voluntary hospitals. If it is urged that this must be so because of the educational

functions of voluntary hospitals, then the same case can be made in respect of junior positions in municipal hospitals, for these positions are very largely held by men and women who come to learn by experience with a view to preparing themselves for more responsible work elsewhere. Much has been said of late of the tyranny of medical superintendents, but it would be helpful if critics would produce concrete examples which can be investigated of alleged interference with the professional work of senior and experienced officers, instead of the vague and general statements which so far have been forthcoming. I submit that the holders of senior clinical positions in the municipal service have full freedom in the treatment of their patients and are given every encouragement to publish scientific papers.

Dr. Bourne would have us believe that the committee of management of a voluntary hospital is willing, almost without exception, to accept the advice of its medical staff. But is this really so? I am old enough to remember acute differences of opinion over the appointment of members of the honorary staff, over the opening or closing of departments, and other matters. I can even recall the board of management of a large voluntary hospital insisting on the resignation of its senior surgeon, in spite of the protests of its medical committee. And the unfortunate thing is that, thinking back, I have little doubt that in almost every case the representatives of the subscribers—i.e., the lay committees—were in the right. I am quite ready to admit that the L.C.C. hospitals are far from perfect. They have a long way to go and much to learn, even from the voluntary hospitals. It must be remembered, however, that it is but twelve short years (and three of them war years) since these same hospitals arose from the "slough of despond" of the Poor Law. Some improvements have taken place, as, I think, all will admit. I wonder if Dr. Bourne can honestly say that more progress has been made in the voluntary hospitals of London in the same period.—I am, etc.,

Northwood, Middlesex. SOMERVILLE HASTINGS.

SIR,—Having been delighted by Dr. Geoffrey Bourne's statement that "the democratic system of medical service is entirely compatible with State control," I was acutely disappointed to find that the bulk of his article was little more than the enumeration of the faults of the municipal system. I was on the point of compiling a similar list of drawbacks of the voluntary system when I realized that neither set of faults was inherent in its particular system, for I have seen the democratic system working well in a municipal teaching hospital, and I have seen autocracy flourish in the voluntary. Defeatism, in fact, had won the day until I read Dr. F. M. Purcell's disastrous suggestion (March 6, p. 300) that 100,000 copies of Dr. Bourne's article should be distributed free! One further quotation from Dr. Bourne's article is sufficient to show how disastrous is this suggestion: "The public must be warned that an autocratic system will impede the speed and efficiency of medical services." This is, of course, nonsense. The speed of some of our largest voluntary hospitals with waiting lists of from two to five years is precisely one of the factors that will make the country reform us if we do not reform ourselves.

With the fervent hope that Dr. Bourne will develop the thesis first quoted, I commend to his notice an article in the *Spectator* (Jan. 29) entitled, "The New Conservatism." The author states that he "is not impressed by the fear of schemes for social security as destructive of enterprise." The Archbishop of York also has recently described as "contemptible" the argument that social security would destroy initiative and take away incentive to work. I myself know several so-called "slaves" in municipal hospitals who are first-rate "chiefs" doing excellent clinical, operative, and research work, in spite of the soul-destroying drawback of having no private practice to keep them stretched.—I am, etc.,

Edinburgh. A. F. ANDERSON.

Future of Women in Medicine

SIR,—I have read with amusement Dr. Jane Scott Calder's dissertation (March 13, p. 329) on sex in medicine, thinly disguised as a serious attempt to treat of the future of women in medicine. Let us examine her concrete suggestions.

1. That medical co-education is fundamentally dangerous on grounds of (*a*) impairment of work due to proximity of the sexes; (*b*) lowering of standards of modesty and morality. Does she really believe that every medical student—man or woman—is concerned solely with sex? Was that her own experience or was she, perhaps, trained at a women's medical school and so has no first-hand knowledge of a co-educational one? Why is co-education specially dangerous in a medical school? Because there are bodies about? What is it that lowers the standards of modesty and morality—lumps of bare flesh?

2. That the entrance age be raised to 22 years on the grounds that all but the best will be eliminated. If the well-to-do are the best this proposition is correct.

3. That a condition of entrance be three years' training as a nurse. The effect of this will be to add time to an already long course and to assist in closing the profession to those with straitened means. If Dr. Calder's proposal has any validity it must be equally applied to men, who will presumably do a three-years course as male nurses.

4. That the aim of the teaching staff be to train medical women, not to teach women to try to be medical men. The aim of medical education is to produce competent doctors.

5. That women should administer to women and children only. It frequently does happen that women doctors deal mainly with women and child patients. This is natural and proper, but it is inconceivable that it should be an irrefragable rule. The training period, in particular, is the time when a woman has the opportunity to become familiar with the mentality of the male patient, so gaining a balanced view of her profession. Would Dr. Calder object to a woman anaesthetist having men patients, or would she prefer her to be hampered by differences in management and technique should she suddenly, as is extremely probable, be confronted with one in an emergency? Would Dr. Calder's purdah also debar a woman pathologist from examining specimens from a male patient?

6. That the hospitals be staffed entirely by women. Is this, on analogy with suggestion 1, to make it quite impossible for sex to rear its ugly head? It is difficult to conceive of any valid reason for depriving students of the best teaching available. Perhaps Dr. Calder is of opinion that a woman-staffed hospital would provide this. If so she is in a decided minority.

7. That the house staff be chosen 75% by special house staff examination and 25% by character and qualities useful to the hospital's future. The path of the medical student and newly qualified doctor is only too heavily beset with examinations, which in any case are a poor test of practical capacity. In selecting officers for house appointments they are unnecessary. The applicants are personally known to the medical staff and can be chosen for character and ability rather than mere book knowledge.

8. That special attention be given to developing a sense of social and public responsibility. This is a quality that comes from within; it cannot be inculcated by "experts," however "sensible."

9. That there should be no birth control clinic at the hospitals. From the prominence given by Dr. Calder to this subject I judge it to be a particularly ferocious bee from the swarm in her bonnet. It is obvious that she is in entire ignorance of the principle of birth control, which, briefly, is to space out families.

—I am, etc.,

London, N.W.3. HELEN BOWER ALCOCK.

SIR,—While agreeing with some of the statements made by Dr. Jane Scott Calder (March 13, p. 329) in her thoughtful letter on medical women, now and in the future, she makes other statements which are sufficiently provocative to challenge further discussion.

1. Women are not to demand the same training, opportunities, and privileges as men, for "women are created women: men are created men." Is there, then, a female brain and a male brain? Does the woman doctor approach the diagnosis, prognosis, and treatment of her patients with a different type of grey matter from that of a man? Her psychology is different, but surely her intellect is not.

2. The sexes violate each other's dignity when each invades the other's sphere. Does this imply that a single woman, a widow, or a grass widow must either starve or sell herself in order to live, rather than earn an honest living by taking up a "man's" trade or profession? Is not all labour, whether of mind or body, a worthy and dignified thing if performed with the right motives and carried on with honour?

3. Women are created for the dignity, nobility, and responsibility of wifehood and motherhood. That, surely, is a fundamental fact acknowledged by all, and it would be well indeed if such privileges were the lot of all women. But is there anything undignified, ignoble, and irresponsible in the woman doctor who carries another woman through the travail of childbirth and tends her with skill and loving care? Is the task of the medical woman less truly feminine than the similar task of her professional colleague, the midwife?

4. Co-education is fundamentally dangerous. This is stated to be due to proximity of the sexes, resulting in lessening of concentration and lowering of moral standards of behaviour. If this be so in most cases (there will always be the abnormal person), then early

home training must be sadly at fault, and sex must have obtained an undue prominence in the minds of those concerned. The segregation of women to their own medical schools and hospitals merely accentuates the sex aspect in medical matters, and suggests, furthermore, that the art of medicine deals with something essentially indelicate, if not worse.

5. Let the entrance age for students be raised to 22 years. This will eliminate all, probably, but the best. It would eliminate all but the wealthy. Does Dr. Scott Calder really believe that strength of character, brilliance of mind, and discipline of the emotions are more readily found among the financially favoured than among those obliged to earn their living?

6. Finally, Dr. Scott Calder urges that men and women doctors should work together for the common good. One wonders how this desirable end is to be attained if they are to be segregated from each other in their years of training at university and hospital. The masculine woman is indeed a sorry sight, but feminine attributes are not best perpetuated and strengthened if women are kept apart from their complementary fellow-workers of the male sex.

—I am, etc.,

Knott End, Lancs. MARY CARDWELL, M.D.

SIR,—I read with dismay Dr. Jane Scott Calder's letter (March 13, p. 329) on the future of women in medicine, advocating the separation of women from men during training and in their eventual work—dismay not so much at the future of women as at the future of medicine as administered by a band of women whose tolerance, humour, and insight into character have been stultified by segregation during their most impressionable years.

I deplore this emphasis on sex, which leads not to co-operation with men but to rivalry. We are all servants of medicine, searchers after truth, and on this field there is no need for a woman—to quote Dr. Calder's words—"remembering and being proud of her sex." She should be unconscious of it. When, very occasionally, a new patient murmurs an apology for a necessary display which he imagines may be distasteful to a feminine eye, I reply, "That's all right; while I am here I am not a woman, but a doctor."—I am, etc.,

Birmingham. DOROTHY ROUGHTON.

Vitamins and Physical Efficiency

SIR,—It is clear from the opening sentence of their article on this subject (Feb. 27, p. 243) that Drs. A. A. Harper, I. F. S. Mackay, H. S. Raper, and G. L. Camm assume that the average student's diet is deficient in vitamins, and that such deficiency has been responsible for deterioration in fitness, since they were able to detect an improvement in resistance to infection and other minor deviations from health as well as in physical efficiency when vitamin supplements were administered to their experimental subjects, cadets at Manchester University. I am not quite sure that these are fair assumptions; but, accepting them as such, my interest is particularly directed to their consideration of "fitness" from two entirely different aspects. I recall a recent report of a similar investigation performed upon a number of school children in whom no advantage whatever in respect of general health and freedom from sickness appeared to accrue from the administration of vitamins. I am not in a position to cite the original report, but Dr. Harper and his colleagues are satisfied with a difference in favour of experimental subjects over the controls which is statistically significant, and anyway it is not my intention to deal with this side of their investigation.

But the authors are also satisfied that there is a corresponding gain upon the physical side, a gain in physical fitness on the lines one is accustomed to recognize in regard to athletic capacity. This improvement they accept as a reflection of the lessened susceptibility to minor infection, or as due to some other action of the vitamins. Now this, surely, is opposed to general experience. The highly trained athlete is by no means immune to infections; on the contrary, he is often particularly susceptible. On the other hand, a high degree of resistance to a bacteria-saturated atmosphere is only too often accompanied by a wretchedly low level of fitness, using that term in the accepted athletic sense.

The possible relation of vitamins to training and to the highest possible level of athletic capacity has naturally appealed to those of us who have been interested in athleticism and allied subjects during the past couple of decades. Ever since men have undertaken feats of speed or endurance, the dietetic side of training has always occupied a prominent place, and claims for superiority have been credited to every article of foodstuff and every kind of system: the more bizarre the greater the appeal to the imagination. Yet a critical consideration has led to the conclusion that there may be equally good results with widely different dietaries. I am speaking, of course, of pre-war days, when there was unrestricted access to any and every kind of foodstuff, so that individual peculiarities and tastes were untrammelled.

Yet there was a certain wish to believe that there might after all be something in the idea that this, that, or the other vitamin had some special relation to athletic capacity. The craving which men in full training experienced for some prohibited or greatly restricted article of diet might then indicate a natural necessity rather than the original sin which old-time trainers discouraged or reprobated. I myself have been at times impressed by the craving for butter; but here it was naturally difficult to distinguish the high-calorie value itself from the fat-soluble vitamins as the essential factor. At one time vitamin B made a bold bid for popularity, and I recall the amusing pronouncement of one authority, with a journalistic flair for the sensational, advocating its liberal administration to athletes, who are notoriously "highly strung," to ensure an adequate provision of the antineurotic vitamin!

I should feel more drawn towards the conclusions in this article and prepared to disregard the usually accepted antagonism between resistance to infection and athletic fitness, and to recommend the administration of vitamins to would-be champions, if I were satisfied with the nature and the records of the tests employed. These included the breath-holding time and the endurance test, familiarly known as the "40 mm. test." I have never been able to accept these as standards of physical fitness, not because they do not indicate some special capacity but because practically all athletes whom I have tested, especially by the latter method, fail miserably in their performances. I do not recall a single example of a man exceeding 50 seconds in the "40 mm. test." I have examples of men of the most supreme physical fitness—athletic champions with world's records to their credit, long-distance cyclists capable of exceeding 20 m.p.h. continuously for twelve hours—who faded out at 20 to 25 seconds. Yet these cadets under consideration averaged practically a minute at their first examination. One of two conclusions seems unavoidable: either that a number of supermen must have been included, which is surely inadmissible, or that the criteria of the performance and interpretation of these tests were very different from those we are accustomed to recognize.

The authors were puzzled by the anomaly that notwithstanding the administration of the vitamins the resting pulse rate became faster and not, as they had expected as a concomitant of improved physical fitness, slower. Their controls showed a diminution of 7.5 beats per minute; those who received vitamins a diminution of approximately 5 beats per minute. So slight a difference appeals to them as significant. As the result of many thousands of observations over 30 years I am prepared to accept a variation of 10 beats per minute as within normal limits, especially in regard to young men of this age whose autonomic nervous system is relatively labile. I am inclined to regard the post-exercise deceleration test as of value in assessing physical fitness, an investigation which I note was undertaken by Dr. Harper and his colleagues, who found, as I would have expected, no significant difference as the result of vitamin administration.—I am, etc.,

London, W.1. ADOLPHE ABRAHAMS.

Abortus Fever

SIR,—I was very glad to see Dr. D. G. Leys's article on abortus fever (Feb. 13, p. 187), in which he reports eight Scottish cases of this disease, illustrating the extraordinary variety of its manifestations and the consequent ease with which the correct diagnosis may be missed. There are many points in his descriptions and comments which are of great interest and which I would gladly discuss, but knowing the restrictions from which you suffer I will confine myself to a few observations which Dr. Leys and others may perhaps find helpful.

Dr. Leys remarks that "the disease does not appear to be a cause of abortion in women, for more than one case has been observed in an undisturbed pregnancy." It is quite true that the great majority of pregnant women suffering from this

disease do not abort and that the reality of such an occurrence was long in doubt. There are now, however, a number of well-authenticated cases. The most convincing of these is perhaps the one recorded by Carpenter and Boak[1] in which *Br. abortus* was grown from the vaginal contents in a case of incomplete abortion, and was also recovered by guinea-pig inoculations of an extract of the entire foetus and placenta. This organism was identified culturally, morphologically, and by the agglutination and complement-fixation tests as a bovine abortus strain. An equally convincing case, but in this instance due to infection with *Br. melitensis*, was reported by Janbon and de Kerleau[2] in a tripe worker at a slaughter-house. This woman had had nine pregnancies, of which eight resulted in normal labour but one ended in spontaneous abortion, and the causative organism was isolated from her blood, her uterine discharge the day after delivery, and from the spleen, liver, heart's blood, and gastric contents of the foetus as well as from the placenta and placental exudate.

An interesting group of cases was reported by Simpson and Frazier[3] in which five women who had suffered from repeated abortions, and in whom a Wassermann reaction was negative, gave a positive agglutination against abortus to a titre varying from 1 in 80 to 1 in 320. All these women drank raw milk, and in four of the cases there was a history of fever. Frei[4] has reported the case of a woman who had a normal pregnancy in 1922 but later had four successive abortions. Her husband was a farmer whose cattle became infected with *Br. abortus* at the end of 1922. In May, 1928, subsequent to the four abortions, *Br. abortus* was found in large numbers in the woman's cervical discharge, and in July of the same year her blood was found to agglutinate the organism to a titre of 1 in 400. As regards my own series of 616 cases, abortion was reported in only one case. The evidence in this case was incomplete, but the clinical history and an agglutination titre of 1 in 1,000 leave no doubt that this was a case of undulant fever. The patient aborted about the seventh month, but apparently no attempt was made to grow the organism from the placenta, foetus, or vaginal discharge.

In speaking of the diagnosis of this disease Dr. Leys says that the "agglutination test seems to provide all that is required for a positive diagnosis." While agreeing that this test is far the most valuable diagnostic agent we have, one should not lose sight of the fact that cases do occasionally occur in which agglutinins are absent but the diagnosis is beyond doubt. One of the pioneer workers on this disease suffered for a number of years from a complaint which she firmly believed was undulant fever, but a number of distinguished doctors who investigated her case refused to accept this diagnosis until the organism was eventually grown from her blood. During all this time repeated efforts to detect specific agglutinins in her blood were uniformly unsuccessful. This, of course, furnishes an additional reason for attempting a blood culture with the special precautions (such as growing in 10% CO_2 and preserving the culture for three weeks instead of three days) which are called for in the case of this organism.

Dr. Leys is right in supposing that meningism is uncommon in this disease, but it is not by any means unknown. Three cases have occurred in my series. In one, stiffness of the neck was the only sign, but in another neck rigidity was accompanied by a positive Kernig's sign, tremor of the hand, pin-point pupils, slurring of speech, and intense drowsiness, and on spinal puncture the fluid showed slightly increased pressure, though it was clear and the cell count was normal. In the remaining case the neck stiffness was accompanied by the absence of both ankle-jerks and one knee-jerk, and on lumbar puncture the blood was normal apart from a colloidal gold reaction of 1223321000. He will find some interesting accounts of similar cases in papers by Molinelli, Miyara, and Basso,[6] Olin,[6] Hardy, Jordan, and Borts,[7] and Sfez and Cohen-Boulakio.[8]

Lastly, with regard to treatment, I agree with Dr. Leys that nothing like a specific remedy has been found for this disease, and that on the whole the results obtained with the sulphonamide compounds are disappointing. He will find the details of the results in my series in a letter of mine which you published in 1941.[9] By far the most successful remedy in my experience is protein shock with T.A.B. vaccine. Of thirty-four cases in my series which were so treated, definite benefit was obtained in twenty-five, doubtful benefit in five, and no benefit in four.—I am, etc.,

Ministry of Health, S.W.1. W. DALRYMPLE-CHAMPNEYS.

1 *J. Amer. med. Ass.*, 1931, **98**, 1212.
2 *Presse méd.*, 1939, **24**, 453.
3 *J. Amer. med. Ass.*, 1929, **93**, 1958.
4 *Schweiz. med. Wschr.*, 1929, **59**, No. 12, 334.
5 *Día. Méd. Ano.*, 1934, **7**, No. 8, 207.
6 *Acta Soc. Med. Suec.*, 1935, Bd. 61.
7 *J. Amer. med. Ass.*, 1936, **107**, 559.
8 *Tunisie Méd. Ann.*, 1931, **25**, No. 9, 472.

Weil's Disease

SIR,—Writing of Weil's disease Dr. K. Blum (Feb. 20, p. 231) advises that every illness with jaundice and high fever should be suspect. It should be emphasized, however, that if jaundice be considered a necessary diagnostic feature many examples of the infection will be overlooked, as more than 50% of cases of Weil's disease do not develop jaundice. In fact, jaundice is no more necessary for the diagnosis of the disease than is a rash for the diagnosis of typhoid. From classical attacks with jaundice to inapparent infections recognized only in retrospect by serological tests, a wide range of clinical types—for example, those presenting influenzal, meningeal, respiratory, or abdominal features—may be encountered. Weil's disease is always worth considering when faced with a clinical picture in which fever, generalized muscular pains and tenderness, conjunctival and scleral vascular injection, and a polymorphonuclear leucocytosis for which there is no obvious cause are predominant. The suspicion should be strengthened if the urine contains albumin, cells, and casts, and if there has been the risk of contact with material contaminated by rats. Cases are particularly to be found among those whose occupations bring them into contact with such contaminated material. During the war of 1914–18 there were many among soldiers from rat-infested trenches, and although these conditions have not been reproduced in the present war, cases may occur in soldiers infected through the inevitable minor abrasions associated with field training or through immersion in water where rats may be present. Military medical officers should therefore be on the look-out for the disease.

Diagnosis is most conveniently confirmed by the agglutination reactions of the patient's serum, the titres rising to significant levels between the first and second weeks of the illness. Adhesion and lysis tests are less commonly employed, and recovery of the organism from the blood during the earlier stages and from the urine during the later stages of the disease makes considerable demands on technique and time. In this connexion it may be remarked that the organisms soon die in acid urines, and, therefore, delay in dealing with such specimens rapidly diminishes the chances of successful isolation; it has been suggested that alkalis should be given to the patient in order to render the urine alkaline when recovery of the organism from the urine is desired. Bearing on this matter is the observation that epidemics of the disease among the cane-cutters in Queensland tend to occur after the heavy rains, which reduce the acidity of the soil and so assist the survival of the organism. In the treatment the early administration of anti-leptospiral serum should be considered, as it is difficult to forecast accurately the course of a case of Weil's disease.

Whatever may be meant by the reference to the relationship between "ordinary infectious hepatitis in wartime" and "morbus Weil," white blood cell counts are a valuable clinical means of differentiating leptospirosis from the common infective hepatitis which is now so widespread. A leucopenia with relative lymphocytosis is commonly accepted as characteristic of the latter infection, although perhaps the exact deviations of its blood picture may still be open to some question. On the other hand, there is no doubt about the valuable diagnostic association of a polymorphonuclear leucocytosis with Weil's disease.—I am, etc.,

London. F. MURGATROYD.

Anaesthesia for Laryngofissure

SIR,—I entirely agree with Mr. L. Colledge (Feb. 20, p. 230) and Mr. W. Howarth (March 13, p. 334) with regard to the use of morphine in laryngofissure and, indeed, either before or after any operation of a severe nature on the upper air or food passages; it should never be administered. I agree with Mr. Colledge, but I disagree with Mr. Howarth, about

9 *British Medical Journal*, 1941, **2**, 455.

the temporary tracheotomy in laryngofissure. One great advantage is that if a disk is removed from the anterior wall of the trachea plugging can be inserted from below before opening the larynx; this entirely prevents the passage downwards of blood into the trachea and bronchi.

I well remember two cases which prove the advantage of preliminary tracheotomy. On one occasion in a nursing home of a large provincial town I operated on a man of 16 st. who had a high blood pressure. I succeeded with some difficulty, owing to excessive haemorrhage, in removing the growth, but nothing short of very firm packing would stop the somewhat alarming bleeding from the cavity of the larynx. The packing remained in position for about 3 hours, and when it was removed there were no signs of haemorrhage, and I returned to London feeling that if there was any more haemorrhage it could easily be controlled, as the tracheotomy tube, needless to say, was left in position. Fortunately there was no further trouble.

Another patient developed alarming haemorrhage 48 hours after operation, and I reached the nursing home just in time to save his life; owing to the presence of a tracheotomy opening I was able to arrest the bleeding. Had the operation been performed without tracheotomy there is little doubt the patient would have died, probably before my arrival. As a matter of fact he survived for 7 years and eventually died of cerebral haemorrhage.

Even supposing the absence of an opening in the trachea resulted in an increased mortality of 1%—and I am convinced this is too low a figure—it would be worth while to carry out tracheotomy in every case, as it is a perfectly safe procedure.

—I am, etc.,

Aylesbury. NORMAN PATTERSON.

War Neuroses: Their Nature and Significance

SIR,—It is interesting that Dr. W. Ronald D. Fairbairn (Feb. 13, p. 183) has brought out the important problem of morale as the result of working from the E.M.S. angle. This focus has emerged from a mass of clinical findings observed from bringing peacetime psychotherapy to bear on wartime neuroses in the combatant Services.

The psychiatric services have a foot in each of the combatant and the civil-social camps, and they are trustees for both. They have thus a difficult task, and have had to create their own framework and evolve within this, and more and more has it become apparent that accurate psychometric assessment is the major issue for shaping a policy and avoiding the necessity for treatment of breakdowns, which is likely to be more than usually difficult and disappointing. Most psychotherapists will not quarrel with Dr. Fairbairn's psychopathology in regard to psychogenic anxiety, but one is not so clear about some of his inferences. Morale is a factor that is going to concern peacetime social life after fighting ceases, and one aim of psychotherapists in the Services must be to diagnose functionally unfit men and return them into civil life before there has been an undue loading of their psychological defences, for these are what they need in civil life.

What does the psychotherapist mean by "morale" when he is discussing this with his colleagues? When a man who has not previously shown delinquent traits begins to lose his morale in the Services and to cease to pay attention to authority and what his fellows think of his behaviour, is he suffering from a regression (in the psychological significance of the term) or is he tending to revert to something nearer akin to his animal ancestry (in the atavistic and biological meaning of the word)? Spinoza once remarked that "the stone in the air would think itself free if it could forget the hand that had thrown it." If man could forget man's hand he would begin to feel he had lost contact with his social sense, with other hands to appeal to for help, as well as feeling free of cultural demands and obligations that his fellows required from him. This kind of loss of contact would seem to be different from the "separation anxiety" of a psychogenic origin if it continued far enough, and it would be observed as a factor displaying mental attitudes and behaviour consonant with these as well as somatic symptoms. A sudden and severe traumatic shock can cut through all psychological defences like a knife and plunge the individual into a physically felt (psychological) danger-situation in which there are no hands to appeal to for help, either because there is literally no perceptual awareness of this in the depths of the fugue or because those in the situation are too dangerous to approach. Such cases are not uncommon. Are all fugues regressions? The loss of morale may be a slower but steady encroachment on the psychological defences (social-sense) until a point of regression is reached where delinquency, as atavism, begins to be displayed. In the previously diagnosed psychopathic personality his delinquency is not now unduly severely dealt with, and the individual is removed to a more suitable sphere.

I think that when Dr. Fairbairn writes of the neurotic Service men *en masse* needing an evangelist rather than a psychotherapist he unconsciously recognizes this atavistic tendency, for he insensibly slips from the psychological significance of morale into that of ethic and morals. Not that many psychotherapists would agree that pastoral psychopathy is desirable either in peace or war. By the terms of our own psychopathology we have all become social through being neurotic, since culture and civilization are emergent from repressions, inhibitions, and social conditioning. But in atavism the individual is heading either for the "animal" world of fear and danger in which he reacts according to the depths of his nature or toward throwing off the feeling of psychological guilt and being free of its repressing restraint. The return into civil life of men with loss of morale or delinquent tendencies is going to be a big problem, and the aim should be to avoid this. It is a psychiatric problem now, and will be after fighting has ceased. It is the biggest problem with regard to the treatment of Germany after the war.—I am, etc.,

London, N.W.8. JOHN MACKWOOD.

SIR,—In my article on the war neuroses (Feb. 13, p. 183) I endeavoured to express my views in a manner sufficiently simple and devoid of psychopathological technicalities to enable them to be understood by the average medical reader. There are certain misunderstandings, however, against which it is difficult for an author to safeguard himself—namely, such as may be introduced by a critic who displaces the original emphasis from one point to another, and treats in isolation particular items which are intended to form parts of a coherent whole. Such is the type of misunderstanding which finds its way into Sir Arthur Hurst's criticism (March 6, p. 299) of my views. Thus, in ascribing to me the view that a war neurosis is "the result of an attempt to restore emotionally the intra-uterine state of security which was rudely disturbed by the experience of birth," he is conferring the status of a major thesis upon what was intended rather to be of the nature of a philosophical aside. At the same time he completely ignores the basic clinical fact to which I draw attention—namely, that separation anxiety (i.e., anxiety over separation from home) is the central and universal symptom in all forms of war neurosis. No theory which fails to offer an explanation of this clinical fact deserves any serious consideration, and in my article I attempted to provide the explanation which seems to me best warranted by the evidence.

According to my reading of the evidence the development of acute separation anxiety in a Service man is due to a regressive reactivation of a state of infantile emotional dependence which has never been properly outgrown. I also feel justified by the evidence in concluding that a war neurosis is characterized not simply by the appearance of certain symptoms but also by specific personality changes associated, both by way of cause and effect, with a lowering of morale. Since the cure of a war neurosis is not just a question of removing symptoms but one of reversing personality changes which are resistant to psychotherapy, and since morale is the very life blood of a military group, I further conclude that the cultivation of morale should take precedence over psychotherapy as a method of dealing with the problem of the war neuroses. Such are the "fantastic beliefs" in the light of which Sir Arthur considers it "easy to understand why Dr. Fairbairn finds that the war neuroses are resistant to *his* psychotherapy" (my italics). Here I must claim a greater measure of modesty than Sir Arthur appears disposed to grant me, for I can assure him that my opinion is based not upon the results of *my* psychotherapy but upon the results which I have observed, whether mine or anyone else's, and not least upon those observed in cases which had been previously returned to duty as cured.

I am not prepared to dispute the results obtained by Cooper and Sinclair during the siege of Tobruk under what Sir Arthur

describes as "the most unfavourable conditions." My experience is admittedly confined to cases treated outside the zone of active warfare. I venture to suggest, nevertheless, that, however unfavourable the conditions at Tobruk might be from the standpoint of psychotherapy, they were conspicuously favourable from the standpoint of morale; and this consideration seems to me to support my general conclusion that the problem presented by the war neuroses is one of morale rather than one of psychotherapy. No results are of the slightest significance, of course, unless assessed in the light of a long-term (as against an immediate) follow-up, and it is only in the light of such a follow-up that the results obtained at the Seale Hayne Military Hospital during the last war by means of "simple psychotherapy in the form of explanation, persuasion, and re-education" can possibly be assessed.

Long-term results aside, however, I cannot refrain from raising the question whether such "simple psychotherapy" is really psychotherapy at all. Nothing that Sir Arthur has said convinces me that I was greatly in error when I felt driven to remark: "What these people need is not a psychotherapist but an evangelist." During the last war scientific psychotherapy had as yet barely emerged, but I fancy that in those days the evangelist had an easier task than he has now after twenty-odd years of complacency and disillusionment. I fancy, also, that it was easier to become an evangelist then.—I am, etc.,

Edinburgh. W. RONALD D. FAIRBAIRN.

Pleurisy and Pleural Effusion

SIR,—In the recent correspondence in the *Journal* on the above subject I see no mention of the subcutaneous tuberculin test, which I have been using with satisfactory results for the past 30 years. I begin with old tuberculin human (T) 0.0002 c.cm. If no reaction follows the dose is doubled again and again up to 6 doses, when the case is pronounced negative. If a distinct reaction follows any particular dose, the test doses are stopped, and the patient is advised to have sanatorium or a course of tuberculin treatment. The test doses are given once or twice a week according to convenience. I find that over 40% of these cases do not react to test doses, and can be set aside as non-tuberculous. This is a much larger proportion than could be rejected by von Pirquet or the intradermal tests. —I am, etc.,

Belfast. JOHN R. GILLESPIE.

Bagassosis

SIR,—The article by Drs. L. I. M. Castleden and J. L. Hamilton-Paterson on bagassosis (Oct. 24, 1942, p. 478) should stimulate interest in the occurrence of respiratory disorders among workers in sugar-cane factories in the Caribbean area. It is remarkable that these disorders have escaped notice up to the present..

During the grinding season air in a cane factory is filled with megass dust (or, as the authors term it, "bagasse" dust), and it is diffused throughout the surrounding air for a considerable distance, hence workers in the factory and people living in the neighbourhood inhale considerable quantities. Somewhat similar conditions are found in rice mills. Having noted that a considerable number of patients suffering from respiratory disorders, especially asthma, who had been referred to me for allergic tests worked in cane or rice mills, extracts of megass and of padi dust were made by Coca's method and the skin reactions of such patients tested by intradermal injection of 0.02 c.cm. Patients who worked in cane factories gave a positive reaction to the megass extract, and those in rice mills to the padi extract.

Early cases obtained relief and sometimes cure by avoiding the offending dust, but as this meant obtaining employment elsewhere, often at lower wages, they tended to return to their former employment, with consequent recurrence of symptoms. Treatment by desensitization with the appropriate extract was quite effective in the early cases, but old-standing cases complicated by chronic bronchitis and emphysema were less amenable to treatment. The latter were helped by small desensitizing doses of vaccines as recommended by Coke and Coke, followed by desensitization to the specific allergen. It would appear, therefore, that these disorders are, as the authors of the paper observed, the result of an allergic reaction. Not having had an opportunity to investigate these conditions in the factory, I am unaware to what extent workers in these industries are affected, but conversations with patients gave me the impression that it is not inconsiderable. The occurrence of respiratory disorders among workers in these industries requires investigation in all sugar- and rice-producing countries in order that methods for prevention may be devised.—I am, etc.,

P. A. CLEARKIN,
Georgetown, Demerara. Govt. Bacteriologist.

Eventration of the Diaphragm

SIR,—With reference to the article by Dr. A. J. E. Mills (Jan. 23, p. 97) under the above heading, there is not sufficient detail to make an exact diagnosis, but it would appear to be similar to that first described by Roemheld and also by Bergmann and Herz. The gastro-cardiac symptom complex first described by Roemheld is another cause for pains in the region of the heart. Gastro-intestinal disturbances result in an upward displacement of the dome of the left diaphragm, and this in turn causes displacement of the heart and larger blood vessels. In such cases there is always a large amount of air in the stomach or the large intestine, especially the left colonic flexure. Patients do not complain much so long as the stomach is empty. This explains, in the case described by Dr. Mills, the inability of the patient to play games for three or four hours after a meal. If he had tried to play games immediately after a meal he would, in all probability, have felt a pain in the heart area, back of the lower end of the sternum, and in the left shoulder. There is no mention of this patient's chest or abdominal measurements or details about his weight. In all probability he had put on some weight, and was also a mouth breather and was therefore unable to breathe deeply. No mention is made of blood pressure or blood-pressure curves in response to exertion; glycosuria is often seen in these cases, possibly due to diminished blood supply to the pancreas; there may have been anacidity, subacidity, fermentative dyspepsia, colitis, or aerophagia; avitaminosis B_1 is common. There is probably an atrophic condition of the diaphragm and often loss of tone in the abdominal muscles as well as inverted breathing. The hiccup is easy to account for and is caused mechanically. The vagus nerve runs through the narrow slit on either side of the hiatus oesophageus. In normal subjects there is ample room for the diaphragm to move up and down, but in old age or as a result of accumulation of gas in the abdomen the hiatus may be enlarged and become lax enough to have either some of the stomach pushed up or the oesophagus pulled down to form a kind of hernia causing irritation of the vagus. This would explain the disappearance of the hiccup when lying down.

This condition is fully described by Bergmann under the heading "epiphrenal syndrome." He carried out many experiments on animals by putting rubber balloons through the oesophageal hiatus and then filling them with air to stimulate the vagus in order to get the effect. These hernias have been demonstrated by *x* rays in 300 cases by Knothe at the Bergmann Clinic. There is also the work of Herz (*Die Sexuelle Psychogene Herzneurose*, Vienna, 1909) on phrenocardia connecting some of these cases up with psychogenic sexual neurosis. He substitutes the word "dyspnoea" for "respiratory block" in order to make a differential diagnosis between the neurosis connected with the diaphragm rather than from the lungs. His work was confirmed by Erb and others.

The position occupied during sleep is very helpful in making a differential diagnosis. Most of the patients sleep on the left side, whereas subjects of organic heart diseases usually sleep on the right. These patients also have hearts that are too small for their bodies and are subject to extrasystoles on sudden change of position. Only recently I saw a patient, aged 23 and home on seven days' leave from the Army, who complained of his heart: feeling of fullness and pain in the region of the heart, difficulty in breathing, nausea, and general feeling of anxiety. On examination (standing) the stomach was distended and there appeared to be a large amount of gas under the left side of the diaphragm. On examining him lying down I noticed the position of his apex beat moved upwards and outwards, and he was most uncomfortable, so much so that I decided to siphon off the air and gave him immediate relief.

These patients are often subjected to attacks of intercostal neuralgia, and one can see small capillary varicosities over the left costal arch, the supraclavicular fossae are frequently seen to bulge, and, according to Roemheld, there is often a deficiency of gastric secretion, and toxins are liable to be absorbed and injure the myocardium by visceral reflex effect.—I am, etc.,

London, W.1. J. E. O'LOGHLEN.

Staffing of Miniature Mass Radiography Units

SIR,—The machines for the examination of the civilian population have been designed for the express purpose of radiographing men and women at the rate of 5,000 a week or 250,000 a year. Naturally it will take time and organization to ensure that each unit will be fed to capacity and at a uniform rate.

The unit may be found to be easy to take to pieces and to reassemble, but difficult to transport from one centre to another, and the best choice of site for its operation may be found only by trial and error. It seems that in the larger towns the first group of machines is likely to be static, and should therefore be erected in a convenient site, where large numbers of the population pass or congregate. The need for adequate dressing-room accommodation has been stressed by Dr. Henderson (Jan. 16, p. 81), and heating and cloakroom attendance should not be overlooked. Sites that automatically suggest themselves might be the London railway termini, the larger stores, or air-raid shelters accommodating some thousands of persons. Such sites might appeal more to the man in the street than, say, the out-patient department of a large hospital.

The method of stamping the identity card, practised abroad, would seem a convenient one to remind the owner of the date when re-examination should be carried out, and to enable the patient's doctor to obtain any information he may require regarding the examination.

It will be found that each machine will be capable of taking a considerably larger number of miniature films than any small group of medical men is able to interpret, and it will be found necesary to make provision for the interpretation of a large surplus of miniature films. It makes little difference whether such interpretation is carried out by physicians or radiologists so long as it is accurate, and I think Dr. Henderson's suggestion that each series of films should be examined by two observers is a wise one, and would suggest that the reports should be made independently and should be correlated by a third observer. It is understood, of course, that every suspected abnormal finding would be checked by routine radiography prior to a clinical examination. Personally I feel that many interpreters would be willing to carry out, say, 500 interpretations per week in their own hospitals or homes provided they were kept informed of the results of the subsequent findings.

The success of the scheme will depend largely on the co-operation of the public, who will need to be informed by the Ministry of Health of its object through the cinema and Press.—I am, etc.,

London, S.W.3. J. V. SPARKS.

Trichlorethylene Anaesthesia

SIR,—Trilene has recently been accused of having two faults: first, that it is liable to be decomposed into phosgene by the heat of the diathermy apparatus; and, secondly, that it may cause auricular fibrillation.

As regards the formation of phosgene, this is no more likely to happen with trilene than with chloroform. In spite of the fact that chloroform is freely used in the presence of fires, flames, and sparks the references in the literature to phosgene formation are rare. Phosgene causes lacrimation and coughing in half the concentration required to do any harm. Lukis describes a case in which coughing and lacrimation were caused by the use of open chloroform in a small room where there was a coal fire and gas jets. The symptoms quickly subsided when the window was opened.

As regards auricular fibrillation, I had a case this morning of a healthy young woman who was being anaesthetized with N_2O 70% + O_2 30% and trilene for dissection of her tonsils. After blind nasal intubation the pulse was normal in rhythm and rate, but 5 minutes later it became faster and grossly irregular. At that time anaesthesia was deeper than necessary (plane 3). Anaesthesia was lightened to plane 2, and 10 minutes later the pulse returned to its normal rate (80 per minute) and rhythm. Anaesthesia was continued for another 15 minutes with the same agents without further incident. There was no cyanosis.

Transient alterations in the heart's action are found to occur not very uncommonly during all kinds of inhalation anaesthesia if they are watched for sufficiently carefully, and not enough data have been gathered to enable a decision to be made as to whether or not trilene is a worse offender in this respect than ether.—I am, etc.,

Colchester. DOUGLAS CLENDON.

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Little Audrey and the Doc

SIR,—Little Audrey had a friend called Emma, who awoke one bright post-war morning with a very bad cold. Her mother, who knew all the answers, said she was to get out of her nice warm bed at once, dress herself, and come to the Health Centre. Emma tried crying, but it didn't work, so she got out of bed and shivered, and presently shivered still more in the rain at the bus stop. She got her own back by coughing all over everyone in the bus, which was very full, because a lot of other people with impetigo, sprained wrists, scabies, rheumatic fever, and what-have-you were going to the Health Centre too. When they got there Emma and her mother sat in a beautiful big waiting-room for hours and hours, while her mother wondered what to do about the shopping and the washing, and got crosser and crosser. Emma just went on coughing and wheezing, till, by-and-by, a man in a white coat said they couldn't see Dr. Smith because it wasn't his day, so Emma just yelled and said she wouldn't see anyone else, and the man said she was a very naughty girl and took her into a room where he examined her very carefully and wrote out a lot of forms in duplicate. Then they had to wait again, because Emma was to have her chest *x*-rayed and her sputum typed and her blood count done. So they had a bun instead of dinner, and Emma went on shivering and got red in the face and sweated, and Emma's mother got crosser and crosser, and Emma cried again, till, about tea-time, another man in a white coat said it was all right: Emma had pneumonia and must go to hospital, and that the ambulance would be along soon.

It turned out to be a very interesting case, because Emma got an empyema, and had all sorts of operations and tests and had ever so many notes and reports all in duplicate, except for some that were in triplicate, and she went to a lovely convalescent home; and her mother was able to get on with the washing and the shopping without a coughing child in the house.

Little Audrey (she was Emma's friend, you remember) woke up with a wheezy cold, too; but her mother was old-fashioned and just rang up Dr. Brown, who had brought little Audrey into the world and knew her colds of old. Dr. Brown came round, and opened the windows and felt the hot-water bottle. Then he tickled little Audrey, who loved him and called him doc-doc, which was most unscientific, till little Audrey laughed and laughed and laughed. She laughed so much that she laughed all the germs out of her chest and got well the next day, which was all very dull, because no one did anything really clever or wrote up any notes in duplicate.—I am, etc.,

Ashtead, Surrey. W. EDWARDS.

I. L. Hamilton-Paterson and L. I. M. Castleden (*Brit. Heart J.*, 1942, **4**, 103) record three cases of intracardiac tumour—namely, a sarcoma of the right auricle in a woman aged 45, a pseudo-myxoma of the left auricle in a man aged 46, and an aneurysm in a man aged 27, which in life produced signs and symptoms attributable to Ayerza's syndrome, mitral stenosis, and pulmonary stenosis respectively. The following classification of heart tumours is suggested: (1) benign tumours due to organization of blood clot—pseudo-myxomata; (2) malignant tumours arising from the mesenchymal elements of the heart wall; and (3) benign congenital tumour.

Obituary

JOHN F. FERGUS, M.A., M.D., F.R.F.P.S.Glasg.

It was with great regret that the medical profession in Glasgow learned of the death on Feb. 18 of Dr. John F. Fergus in his 78th year. Dr. Fergus belonged to a distinguished medical family in Glasgow, his father being the late Dr. Andrew Fergus (an intimate friend of Lister when in Glasgow), one-time President of the Royal Faculty of Physicians and Surgeons, and his elder brother, Dr. Andrew Freeland Fergus, the well-known ophthalmologist.

John Freeland Fergus was educated at the High School of Glasgow and Glasgow University, graduating M.A. in 1883, M.B., C.M. with high commendation in 1888, and M.D. in 1897. After graduating he was house-physician at the Western Infirmary, and continued his studies at Vienna and Jena. Throughout his professional career Dr. Fergus was much concerned in public medical affairs. He represented the Royal Faculty on the board of management of the Glasgow Royal Infirmary, and for several years was convener of the medical committee. He also represented the Royal Faculty on the board of the Royal Technical College of Glasgow, and gave good service in a similar capacity to the Broomhill Home for Incurables and the West of Scotland Seaside Homes, Dunoon. Always actively interested in his university, he was largely instrumental in securing the excellent playing fields at Anniesland, and as an assessor on the university court, elected by the general council of the university, he played an important part in the government of the university. In all of these positions he showed a proper business sense, and was actuated by a spirit of fair-mindedness and anxiety for the welfare of the institution. In the last war he was a visiting physician to the Springburn-Woodside Red Cross Hospital, and after the war assisted in the teaching in the Royal Infirmary as assistant to the Muirhead professor of clinical medicine.

Dr. Fergus was a most ready writer, both in prose and in verse. He contributed to the *Glasgow Medical Journal* papers of purely medical interest as well as some on the history of medicine. "Some Medicines of our Ancestors" was published in that journal in 1918, and about the same time his paper on "The Medical School of Salerno" was read to the Royal Medico-Chirurgical Society. Perhaps it was as a poet and reciter of his own poems (though he maintained that they were no more than "trivial verses") that Dr. John Fergus was most widely known to the profession and the public of Glasgow. He was the author of many topical poems much in request at medical and other social gatherings, and was a member, sometime vice-president, of the Glasgow Ballad Club. His volume entitled *Carmina Urbis et Ruris* contains compositions for meetings of one of Glasgow's favourite social medical societies—the Town and Country Club. In the last war he published a small volume, *The Sodger and Other Poems*, the proceeds of the sale of which were devoted to the Sailors and Soldiers Families' Association. The *Fancies of a Physician*, published in 1938, is a representative collection of some most admirable verse, "medical and otherwise," grave and gay, in Scots and in English, the most noteworthy celebrating the Royal Faculty and its founder, Maister Peter Lowe, the Royal Infirmary, and the Royal Medico-Chirurgical Society. He leaves a wife and son and daughter, to whom sincere sympathy will be extended.

Dr. R. H. TASKER died at sea in the latter part of November, 1942, as the result of enemy action, at the age of 50. Ronald Henry Tasker began his medical studies in the University of Bristol and did his clinical work at the Bristol General Hospital. In 1917 he qualified M.R.C.S., L.R.C.P., spending the next two years with the Fleet as temporary surg. lieut., R.N. He was house-surgeon and house-physician at the Bristol General Hospital and filled resident appointments at Herefordshire General Hospital and at Ham Green Hospital, Bristol. In 1926 he became medical officer to the Burmah Oil Company and entered with enthusiasm into life in the East. For 16 years he rendered able and devoted service in various parts of Burma, and at the time of the Japanese invasion was in charge of the company's hospital at Syriam, Rangoon. Here he remained while the demolitions were completed, afterwards making a precarious escape to India. He finished the remainder of his term of service in Assam, and was returning to England when his ship was torpedoed in the South Atlantic. In 1930 he married Dr. Dorothy Buckmaster, daughter of the late professor of physiology of Bristol University, and to her and to the young son and daughter the sympathy of the profession will be extended. A colleague writes: It is difficult to convey any idea of Ronald Tasker's vivid and joyous personality. Everything humdrum and petty was dispelled by his unforced gaiety and abounding good nature. His was the great gift of laughter and the superlative merit of communicating happiness to others. Yet he was conscientious to a degree in his professional work, in which he showed great skill as a surgeon, and he had a remarkable athletic career. Ronald Tasker was a county player in association football, tennis, and badminton. In his student days he played, as an amateur, for Bristol City, then in the Second Division of the Football League. While recovering from a severe football injury he studied croquet and became a first-class player. His wife shared his love of games, and for many happy years they were a formidable pair in tennis and badminton tournaments in Burma. Possessed of amazing energy and concentration, for both work and play, he found time to be widely read, especially in comparative religion and anthropology. His friendship was actuated by sincerity and loyalty, but never by expediency. Thus there were those in many walks of life who were proud to call him friend, and would cordially agree that they owed to him some of their happiest hours. There were 54 in the lifeboat in which he died, after being many days adrift, and one of the two survivors has told me the tragic story of his passing. An inspiring colleague, a gallant sportsman, and a true friend.

Dr. DONALD BUCHANAN, who died at Eltham on Jan. 18 at the age of 63, came of a family which had lived on the Isle of Barra for many generations Buchanan studied medicine at Aberdeen University, where he graduated M.B., Ch.B. in 1908. He took the D.P.H. of the University of Birmingham in 1910, proceeding M.D. in 1911. Some years before the outbreak of the last war he was appointed port health officer at Singapore, and later at Port Moresby, New Guinea. From the latter post he returned to this country to serve with the R.A.M.C.—he was attached to the Territorial Army before he went abroad—and distinguished himself in France, being mentioned in dispatches several times. When the war ended he went to Edinburgh, where he took the F.R.C.S. He then settled in South-East London and built up a large practice there. Last August he published *Reflections on the Island of Barra*. An able practitioner, he will be sorely missed by the many patients who looked on him not only as their medical adviser but as their friend in need.

We regret to announce the death on Feb. 19 of Dr. T. ANSTEY-CHAVE of Redhill. Born at Hereford in 1870 and educated at the Cathedral School, Thomas Anstey-Chave first joined a firm of London stockbrokers, but finding that City life was deleterious to his health he decided to take up medicine, which was his original interest. From St. Bartholomew's Hospital he qualified M.R.C.S., L.R.C.P. in 1896, and four years later took the M.B.Lond. and the F.R.C.S.Ed. He was then appointed house-surgeon at the Hereford General Hospital, and after holding two assistant posts at mental hospitals he took a share in a general practice in Cardiff, where he stayed for 13 years. His health, however, gave way and he went abroad for some months. When he recovered he took over the practice of Dr. Drake of Redhill, developing the radiological work there, and became an acknowledged authority in the district. He was radiologist to the East Surrey, Sevenoaks, and Dorking Hospitals, and had several other radiological appointments. Dr. Anstey-Chave had been a member of the B.M.A. since 1899. He represented his Division at the Annual Meetings in 1917 and 1918, and was secretary for the Reigate Division in 1922 and chairman from 1925 to 1927. He was also secretary of the Surrey Medical Benevolent Society from 1922 until his death.

Dr. JAMES MAIR RUTHERFORD, whose death, we regret to announce, took place at Bristol on Feb. 22, followed his father's profession and also his specialty, for he was the son of the late Dr. James Rutherford, medical superintendent of the Crichton Royal Institution, Dumfries, and for the last 34 years had been medical superintendent of Brislington House, a private mental hospital near Bristol. Rutherford qualified M.B., C.M. at Edinburgh in 1894, took his membership of the Royal College of Physicians of Edinburgh in 1906, being awarded the Gaskell Prize, and became a Fellow in 1909. He was senior assistant physician at the Royal Asylum, Morningside, before he went to Bristol. Of athletic build, Dr. Rutherford excelled at hockey and golf, and was also a first-class shot. He had been a member of the B.M.A. for 46 years.

Medical Notes in Parliament

Diphtheria Outbreak traced to Milk Supply

Sir FRANCIS FREMANTLE on March 11 asked the Minister of Health whether the outbreak of diphtheria in East Yorkshire, traced to new clean milk from a farm, was due to infection the spread of which could have been prevented by pasteurization, and what action had been taken to avoid such danger in future. Mr. ERNEST BROWN replied that the spread of infection in the case referred to would have been prevented by pasteurization. Only one cow was kept on the farm concerned, and the sale of milk from this farm had been ended.

Health in the West Indies

Colonel OLIVER STANLEY opened, on March 16, a debate on colonial administration in the West Indies. He said the section on health in the Stockdale report well set out the health problems which would have to be met. In many ways the most important was the suggestion of the health community system, an attempt to take into rural, scattered communities the health advantages normally found in an urban, highly populated area. The Colonial Office had given authority for a large-scale experiment in this health community system in the Jamaica parish of St. Catherine.

Mr. CREECH JONES referred to malnutrition and doubted whether the proposals of the report were enough to deal with the squalor and dreadful housing in most of the West Indian colonies. Dr. HADEN GUEST cited evidence from the Committee on Nutrition in the Colonial Empire that in Jamaica rickets was frequently found among younger school children. The health problems of the West Indies were insoluble without adequate nutrition. To erect a costly medical structure on the basis of the poverty of the West Indies would give the doctors appointed an impossible task. Dr. MORGAN suggested a mobile team of medical experts ready to go to islands where epidemics had broken out or to others where water supplies needed attention. The Stockdale report did not mention or did not emphasize hookworm disease because Government policy made that disease endemic. There was no decent scheme, except in Trinidad, for proper latrines to prevent the infection. Medical officers engaged in preventive work had no opportunity for doing their work properly. Leprosy could be abolished in the West Indies in a generation. Many sufferers from leprosy filtered back to this country by means of retired officers from the Colonies and now tramped the streets of Great Britain unrecognized.

Dermatitis in Mining Industry

On March 17 Mr. BERNARD TAYLOR asked what steps were being taken to deal with dermatitis in the mining industry. Mr. TOM SMITH answered that any epidemic of this disease, however small, reported among a particular set of workers at a particular mine was investigated in relation to the working conditions, and ameliorative measures taken so far as possible. The large majority of the cases appeared to be sporadic in the sense that they comprised, in ones and twos, workers having many different occupations and employed at many different mines. These cases presented a difficult problem which would be further investigated through the medical officers of mines who were taking up their duties in the coalfields.

Vaccination in the Army.—Answering Mr. Viant on March 16 Sir JAMES GRIGG said vaccinations in the Army were performed in accordance with instructions essentially similar to those issued by the Ministry of Health to public vaccinators. Successful cutaneous vaccination must of necessity lead to the formation of scar tissue, but scars resulting from present methods of vaccinating soldiers were generally very slight.

Medical Regrading and Army Employment.—In a reply on March 16 Sir JAMES GRIGG said a man's physical condition tended to improve as a result of Army training, and in a normal case the medical officer who had watched the man at work could properly determine when he was fit for a higher medical grading. This arrangement would, however, shortly be modified. Army selection centres were being instituted. Eventually all soldiers whose change of medical category entailed a change of employment would pass through these centres and there be classified and allotted to the duties they could best perform. Men suffering from defects which could be cured would be given special remedial training.

Public Health Propaganda.—Asked how many posters in the series entitled "Coughs and Sneezes Spread Diseases" had been issued by his Department for publication, Mr. BROWN said on March 16 that in the current campaign which began last October 152,170 posters and vehicle bills had been issued at a cost of £12,600.

The Services

Capts. O. I. Green, W. N. Hine, and E. D. V. Nicoll, R.A.M.C., have been awarded the M.C. in recognition of gallant and distinguished services in the Middle East.

The name of Lieut. (now Capt.) D. P. G. Paisley, R.A.M.C., was included in a list of officers and men commended for brave conduct in a *Supplement* to the *London Gazette* dated Feb. 17, 1942. We regret that, through an oversight, this item of news was not published in the *Journal* at the time.

Temp. Surg. Lieut. W. D. G. Troup, R.N.V.R., has been mentioned in dispatches.

The annual general meeting of the members of the Auxiliary R.A.M.C. Funds will be held at 11, Chandos Street, W., on Monday, April 5, at 6 p.m., when the annual report and financial statement for the year ended Dec. 31, 1942, will be presented and officers elected for 1943.

CASUALTIES IN THE MEDICAL SERVICES

Major W. L. BROOKES, Indian Medical Department, is included as "died" in an India Office Casualty List published on March 15.

Temp. Surg. Lieut. JACK BLOOR HOUGHTON, R.N.V.R., is included as "missing, presumed killed," in an Admiralty Casualty List published on March 13. He was born on March 20, 1917, and received his professional education at King's College Hospital, qualifying M.R.C.S., L.R.C.P. in 1940. Before entering the R.N.V.R. in July, 1941, he held an appointment at the Blind School Hospital, Leatherhead, Surrey. In Aug., 1942, he was mentioned in dispatches for distinguished services in convoys to Murmansk. He was a member of the B.M.A. and his home was at Woodthorpe, Nottingham.

Lieut. EDWARD RAYMOND STONE, R.A.M.C., is included as "killed" in an Army Council Casualty List published on March 17. He was born on March 5, 1913, and graduated M.D.Georgetown in 1939. He entered the U.S.A. Section of the R.A.M.C. in Aug., 1941. His home was at Washington, D.C.

Prisoners of War.—Lieut. W. G. Anderson, I.M.S., Acting Major A. M. Best, I.M.S., Capt. T. R. S. Cormack, R.A.M.C., Acting Major A. C. Glendinning, I.M.S., Capt. D. W. F. Gotla, R.A.M.C., Lieut.-Col. C. W. Maisey, R.A.M.C., Col. J. M. Mitchell, O.B.E., I.M.S., Capt. L. Sefton, R.A.M.C., Surg. Lieut. D. R. Syred, R.N.V.R., Surg Lieut. J. C. Wyatt, R.N.

Missing.—Capt. J. A. Perkins, R.A.M.C.

Medical News

Sir Hugh Lett will deliver the Thomas Vicary Lecture at the Royal College of Surgeons of England, Lincoln's Inn Fields, W.C., on Friday, April 2, at 4 o'clock. His subject is "Anatomy at the Barber-Surgeons' Hall."

The Council of Epsom College will in July award a France Pension of £30 a year to a necessitous medical man, fully 55 years of age, who has been registered for five years, and who is in need of help. The Council will also award St. Anne's Scholarships to girls attending Church of England schools, who must be fully 9 years of age and be orphan daughters of medical men who have been in independent practice in England or Wales for not less than five years. The value of each scholarship is dependent upon the means of the applicant and the locality and fees of the school selected. Educational grants will also be available from the Sherman Bigg Fund for children of either sex. These are not restricted to orphans or to members of any religious denomination, but candidates must be of public school age and in need of such help. Forms of application for the vacant pension and for the scholarships and grants can be had from the Secretary's Office, Epsom College, Surrey, and must be completed and returned by April 30.

A postgraduate lecture and demonstration on living models of clinically approved means of contraception will be held at the C.B.C. Mothers' Clinic, 108, Whitfield Street, W.1, on April 1 at 2.30 p.m. Applications to attend should be sent to the secretary beforehand.

At a recent meeting of the Central Midwives Board for Scotland Prof. R. W. Johnstone and Prof. James Hendry were elected chairman and deputy chairman respectively for the ensuing year.

Surg. Rear-Admiral C. P. G. Wakeley will give a lecture on "Blast Injuries in Total War" at Chichester County Hall on Thursday, April 1, at 2.30 p.m.

Air Commodore Geoffrey Keynes, R.A.F.V.R., will give a discourse on "The History of Blood Transfusion" at the Royal Institution, 21, Albemarle Street, W., on Friday, April 9, at 5 p.m.

The annual general meeting of the Institute of Hospital Almoners will be held at St. Ermin's Restaurant, Caxton Street, St. James's Park, S.W., to-day (Friday, March 26) at 6 p.m., when Prof. James Mackintosh will give an address.

A conference on education, arranged by the Association of University Professors and Lecturers of Allied Countries in Great Britain, will be held at the Royal Institution, 21, Albemarle Street, London, W.1, on April 10. The two subjects for discussion will be the function of a university in a modern community and methods of practical co-operation between Allied universities in the future. Tickets of admission may be obtained from the conference secretary, 40, Queen's Gate, S.W.7.

Miniature mass radiography units are to be set up in Edinburgh, Glasgow, and Lanarkshire. Mr. Tom Johnston, announcing this decision, also stated that the scheme providing allowances for dependants of patients undergoing treatment for tuberculosis was nearly complete. Maintenance payments would include sums for dependent children according to age and payments to meet such special items as high rents, insurance, mortgage charges, etc. The scheme might have to be reviewed in the light of plans arising out of the Beveridge report or out of any general arrangements for rehabilitation.

Proposals for the establishment of a department of neurology in association with Manchester University are being submitted to the Nuffield Trust by the Provincial Hospitals Regionalization Council at Manchester.

Mr. G. W. Blomfield, F.R.C.S., has been appointed director of the Radium Centre, Sheffield.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* a rise in the incidence of whooping-cough, 90 cases, and of acute pneumonia, 77 cases, and decreases in the notifications of measles, 682, and dysentery, 28, were the chief features of the returns during the week. The fall in the notifications of measles was largely due to experience in the North. The largest decreases were those of Yorks North Riding 361, Yorks West Riding 277, Durham 232, Lancashire 184, and Yorks East Riding 149. In the South with a few exceptions the incidence continued to rise, the most notable increases being Essex 157, Gloucestershire 135, Devonshire 85, Sussex 82, Berkshire 73, and London 60.

There were 79 deaths from influenza in the 126 great towns. This is the third consecutive week that a fall has been recorded, and it seems that the danger of a possible large epidemic has passed. During the first nine weeks of this year 887 deaths were recorded in the great towns, compared with 644, 1,683, 3,489, 2,053, 559, and 6,679 for the corresponding period of the six preceding years.

During the week 68 cases of dysentery were reported, 28 fewer than in the preceding week and the lowest weekly total for the past six months. Lancashire with 18 cases and London with 12 accounted for almost half the total notifications. The only other notable local fluctuations in the incidence of infectious diseases were for pneumonia, rises of 45 and 40 being recorded in Durham and Wales respectively, and a fall of 78 in Yorks West Riding. In London there was an increase of 52 in the notifications of whooping-cough.

In *Scotland* there was a sharp rise—from 10 to 22—in the number of cases of cerebrospinal fever in the city of Glasgow. The increase in the notifications of dysentery was due to the experience of the city of Aberdeen, where 12 cases were reported; 11 were recorded in Glasgow, and the two cities together accounted for two-thirds of the total. There was another small rise in the incidence of measles in Glasgow, where 317 of the 477 notifications were recorded.

In *Eire* the chief feature was a decrease of 23 in the notifications of diphtheria.

The Week Ending March 13

The returns of infectious diseases in England and Wales during the week included: scarlet fever 1,907, whooping-cough 1,864, diphtheria 794, measles 19,799, acute pneumonia 1,315, cerebrospinal fever 86, dysentery 78, paratyphoid 4, typhoid 4. Deaths from influenza in the great towns numbered 69.

No. 9

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended March 6.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1943					1942 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	91	6	39	4	5	218	12	41	8	8
Deaths		1	1				1	3		
Diphtheria	827	46	215	103	32	876	32	183	60	22
Deaths	15	—	4	1	1	19	—	6	4	—
Dysentery	68	12	38	1	—	120	20	26	1	—
Deaths	—	—	—	—	—		1	—	—	—
Encephalitis lethargica, acute	1	—	—	—	—	8	—	—	1	—
Deaths		—	—				—	—		
Erysipelas			70	7	1			51	9	1
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years				24						
Deaths	48	8	4	14	2	38	4	8	11	1
Measles	19,200	1,421	477	11	45	2,550	213	200	138	47
Deaths	22	3	—	—	1	1	1	1	2	—
Ophthalmia neonatorum	103	4	25		2	9	4	16		—
Deaths										
Paratyphoid fever	7	—	—	1	—	12	1	2	—	
Deaths	—	—	—	—	—	—	—	2	—	
Pneumonia, influenzal*	1,450	72	26	14	9	1,276	62	19	4	14
Deaths (from influenza)	79	8	8	—	2	62	10	6	1	—
Pneumonia, primary			411	19				328	22	
Deaths		—		12	15		62		17	15
Polio-encephalitis, acute	2	—				2	—			
Deaths		—					—			
Poliomyelitis, acute	4	1	1	2	—	3	—	1	1	—
Deaths		—	—				—	—		
Puerperal fever	—	6	17	3	—	1	1	7	2	—
Deaths		1					—			
Puerperal pyrexia	179	14	16		1	197	16	10		—
Deaths										
Relapsing fever	—	—			2	—	—			—
Deaths										
Scarlet fever	1,928	148	268	49	50	1,231	34	166	46	17
Deaths	1	—	—	—	—	—	—	—	1	—
Small-pox	—	—	—		—	—	—		—	—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever†	2	—	4	20	3	10	1	—	9	—
Deaths	2	1	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—			—	—	—
Whooping-cough	1,876	197	176	35	19	1,290	164	45	24	6
Deaths	9	2	2	3	—	8	2	—	—	3
Deaths (0–1 year) Infant mortality rate (per 1,000 live births)	412	42	69	47	34	430	52	79	43	20
Deaths (excluding still-births)	4,948	773	609	232	148	6,049	883	768	294	167
Annual death rate (per 1,000 persons living)			13·7	15·3	‡			17·3	19·6	‡
Live births	6,489	793	851	445	250	5,196	529	760	312	214
Annual rate per 1,000 persons living			17·4	29·3	‡			15·7	20·8	‡
Stillbirths	215	14	25			254	37	42		
Rate per 1,000 total births (including stillborn)			29					52		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Letters, Notes, and Answers

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ANY QUESTIONS?

Iron in Diet or as Drug

Q.—*If hypochromic anaemia is said to result from deficiency of iron in the diet, how is it that an increase in dietetic iron makes no improvement in hypochromic anaemia?*

A.—It is difficult to give much more than maintenance requirements of iron by diet alone. In hypochromic anaemia the marrow is abnormal and often requires stimulation by a large dose of iron before it will respond. This has been called the "threshold phenomenon."

Cramp in an Elderly Woman

Q.—*What is the cause of cramp in elderly women? What is the best way to prevent them and to relieve them?*

A.—Varicose veins, arteriosclerosis, and diabetes are probably the commonest causes of cramp in elderly women. Treatment is primarily of the causative condition. Relief may be obtained from warm leg baths twice daily, nicotinic acid 50 mg. daily, and resting with the feet up.

Enterospasm and Spastic Colitis

Q.—*I would be grateful for suggestions in treatment of a case of severe and frequent enterospasm in a man of 50 who is also suffering from rheumatoid arthritis. He has had every sort of orthodox and unorthodox treatment for the latter, which is thought to be allergic and not infective in origin. For the enterospasm he has had belladonna and atropine in all forms, and ephedrine. He has had wash-outs. It would be very difficult to arrange for psychological treatment.*

Q.—*There is an increasing tendency nowadays to classify "spastic colitis" as an allergic disease. Is there any evidence as to the nature of the allergen, and is it possible to desensitize a patient, as in asthma? Apart from this, what is the best treatment, and what advice should one give a patient with regard to war work?*

A.—Enterospasm is never a primary condition. Its treatment therefore depends upon the discovery and removal of the cause. Atropine before meals in maximal dosage for the individual, with codeine if there is diarrhoea, relieves the discomfort and pain. The causes of enterospasm can be summarized as follows:

1. Acute intestinal irritation with or without actual enteritis and/or colitis. (*a*) Food poisoning. (*b*) Excess raw fruit, especially unripe, or raw vegetables, especially wartime salads of vegetables not commonly eaten raw.
2. Abuse of purgatives: extremely common.
3. Intestinal carbohydrate dyspepsia: very common. Associated with distension of colon and excessive flatus, the passage of which gives relief. Treatment by restriction of potatoes and other root vegetables, and rice.
4. Excessive smoking.
5. Allergy: recurrent very short attacks of pain which may be associated with diarrhoea, vomiting, rhinorrhoea, or urticaria.
6. Lead poisoning.
7. A rare form of tabetic crisis.
8. Organic disease of colon. (*a*) Colitis; always diarrhoea with mucus and generally blood in stools. (*b*) Diverticulitis; pain and tenderness, especially left iliac fossa; normal stools. (*c*) Carcinoma.

There is no such clinical entity as "spastic colitis." True colitis is always associated with spasm; it is primarily infective, occasionally toxic, and never allergic. Spastic colitis is sometimes used as a synonym for "muco-membranous colic" which has become very rare in recent years. This too is not a colitis, as sigmoidoscopy shows a healthy mucosa and the mucous shreds and casts contain no inflammatory material. It is a form of colon spasm occurring in nervous individuals, generally women, and associated with excessive secretion of mucus. It is always accompanied by constipation, which should be treated with paraffin and isogel but no aperients or enemas. In rare instances it is caused by specific foods and may then be allergic; such foods should be avoided, but desensitization is useless. The more war work the patient does the better, as it helps him to become less bowel-conscious.

LETTERS, NOTES, ETC.

Double Beds and Scabies

DR. FREWEN MOOR (Norwich) writes: A few months ago I pointed out that the spread of scabies was largely due to the use of double beds, and that the almost complete immunity of the rich was due to their use of single beds for children and unmarried adults. Scabies is only an extreme case of the general law that infectious and contagious diseases are disseminated by close and prolonged contact. Who in his senses would share a bed with a person suffering from influenza or even a cold in the head, unless he definitely wanted to catch it? And yet that is done as a matter of course in the great majority of English homes. After the war there will be an enormous demand for furniture to replace what has been destroyed and for the setting up of new homes, and now is the time to launch propaganda for single beds. Of course these will cost more, but people might be persuaded to go to the extra expense if the advantages were pointed out to them in good time. I do not know whether the houses built by the public authorities always have bedrooms big enough to take two or three single beds instead of a double one, but this is a matter to be considered when new houses are being planned. A lot of attention is paid to conditions in factories, but unsatisfactory hygiene in the home has hardly been touched, although it is really more important. We doctors are too much inclined to accept existing conditions and to treat the results. Now is a favourable opportunity, unlikely to recur, to change one bad old custom.

Nasal Defence

DR. ALEXANDER FRANCIS (London, W.1) writes: Dr. Octavia Lewin (Feb. 6, p. 178) is right in thinking that the nose supplies one of Nature's most important lines of defence, but wrong, I maintain, in regretting that coupons are now necessary for handkerchiefs. There is nothing, except the local application of preparations containing adrenaline and ephedrine to the nasal mucous membrane, which does more damage to the proper functioning of the nose than frequent nose-blowing. Resistance to catching cold depends chiefly upon active circulation. Nose-blowing interferes seriously with the proper circulation in the nose; it drives the blood into the turbinated bodies, causing nasal obstruction and increased secretion, thereby providing a good example of a vicious circle: the more one blows the more the secretion, the more the secretion the more one blows. Anyone can produce a condition of nasal obstruction and catarrh by sufficient nose-blowing, whereas nasal obstruction, if not too well established, and hypersecretion can be removed by deep nasal inspirations, which draw the blood away from the mucosa and promote a more active circulation. To teach children to blow their noses constantly is a most harmful practice, as it leads to the engorgement of the turbinated bodies, to increased nasal secretion, and to the development of adenoids.

Filaria Worm in Eye

DR. ANDREW SIMPSON (Hawick) writes: I was interested in the accounts by Squad. Leader M. C. T. Reilly and Dr. C. R. Duncan Leeds of the removal of filaria from the eye. I have had to remove a worm from a patient's eye on three occasions, the last being a few weeks ago. She was in Nigeria for some time, but left there 5 years ago, and says that she left the infective area 7 years ago. She had no trouble until 1939, when, following swellings in various parts of the body, she appeared with a worm wriggling in the subconjunctival tissue. On each of the occasions it was about 5 a.m., and I found that the application of tropocaine (Waite), while anaesthetizing the eye completely, had no effect on the worm. A straight needle held in artery forceps was used to pierce the conjunctiva about the centre of the worm, and, impaling it, to withdraw it through the incision. The patient tells me that her husband has had them removed from his eye with darning needles, and certainly this method seemed very easy. Perhaps I was lucky that on each occasion the worm was so accessible. It was about 35 mm. long each time and a *Loa loa*. The time factor seems to bear out a longer stay in the body than is usually held as its life, while there are continuing small swellings in this case in the breast and particularly the legs.

Nocturnal Cramp

DR. LIONEL J. PICTON writes: The old "sovran remedy," one-tenth of a grain of calomel at bed-time, should not be forgotten. It may be guaranteed to obviate the cramp from the second night of its use. How it acts I know not; but at a guess it may be a catalyst.